

AMERICAN MUSEUM *Novitates*

PUBLISHED BY
THE AMERICAN MUSEUM
OF NATURAL HISTORY

CENTRAL PARK WEST AT 79TH STREET
NEW YORK, N.Y. 10024 U.S.A.

NUMBER 2583

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Number 2583, pp. 1-40, figs. 1-106, maps 1-9

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A Revision of the Spider Genera *Haplodrassus* and *Orodassus* (Araneae, Gnaphosidae) in North America

NORMAN I. PLATNICK¹ AND MOHAMMAD U. SHADAB²

ABSTRACT

The nine species of *Haplodrassus* and four species of *Orodassus* known from North America are diagnosed and described. Relationships between European and American *Haplodrassus* are examined; one Holarctic species and three pairs of sister species separated by the Atlantic Ocean are recognized. Two new species are described: *H. chamberlini* from western North America and *O. canadensis* from the northern United States and Canada. Six specific names are newly synonymized: *H. dystactus* Chamberlin and Gertsch and

Drassodes ferrum-equinum F. O. P.-Cambridge, both with *H. signifer* (C. L. Koch); *H. admes* Chamberlin and *H. uncifer* Chamberlin, both with *H. bicornis* (Emerton); *H. utus* Chamberlin and Ivie with *H. eunis* Chamberlin; and *O. duranti* Chamberlin with *O. assimilis* (Banks). The males of *H. mimus* Chamberlin, *H. dixiensis* Chamberlin and Woodbury, *H. taibo* (Chamberlin), and *O. orites* Chamberlin and Gertsch, and the female of *H. maculatus* (Banks) are described for the first time.

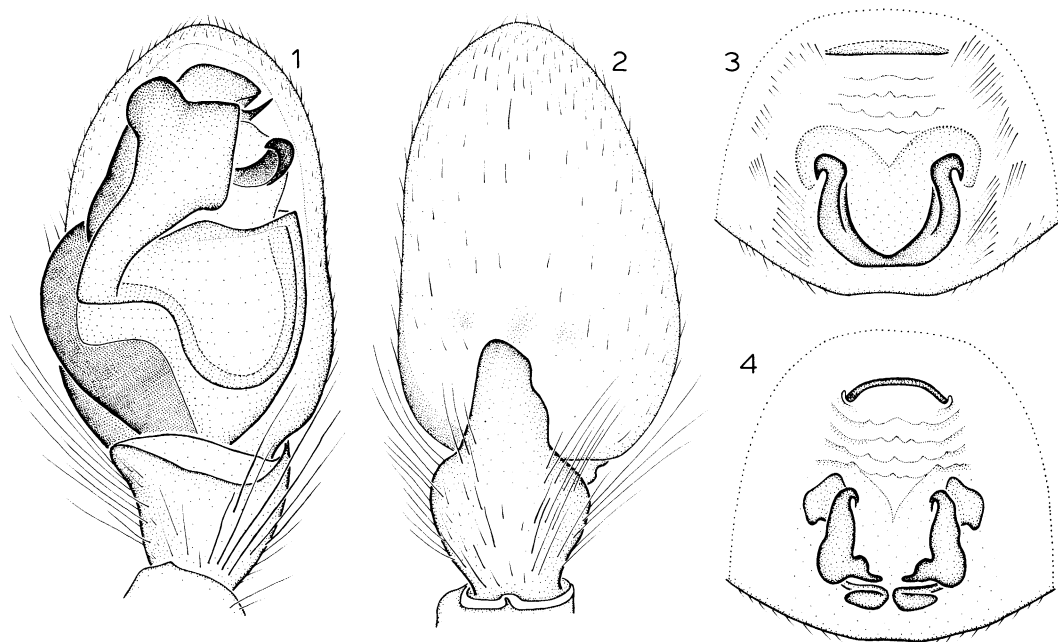
INTRODUCTION

The present paper, the fourth in a series on the spider family Gnaphosidae, is concerned with the closely related genera *Haplodrassus* and *Orodassus* in North America. Although both genera were established by Chamberlin (1922) for American species and *Orodassus* is apparently restricted to North America, *Haplodrassus* has a Holarctic distribution. About 20 species of *Haplodrassus* have been described from Europe and there are probably about as many in Asia, although most of the described Asian forms have been mistakenly placed in *Drassodes*, a totally unrelated genus.

Both genera are most easily recognized by their distinctive genitalia. Most *Haplodrassus* males have characteristically flattened and dorsally shifted retrolateral tibial apophyses (fig. 2), whereas most *Orodassus* males have bifid retrolateral tibial apophyses which are among the most complex in the family (fig. 76). Of interest, however, is the description below of the previously unknown male of *Orodassus orites* Chamberlin and Gertsch, which is in many ways intermediate in genitalic structure between the two genera. The palp (figs. 103, 104) resembles that of *Haplodrassus* in that the embolus is recessed

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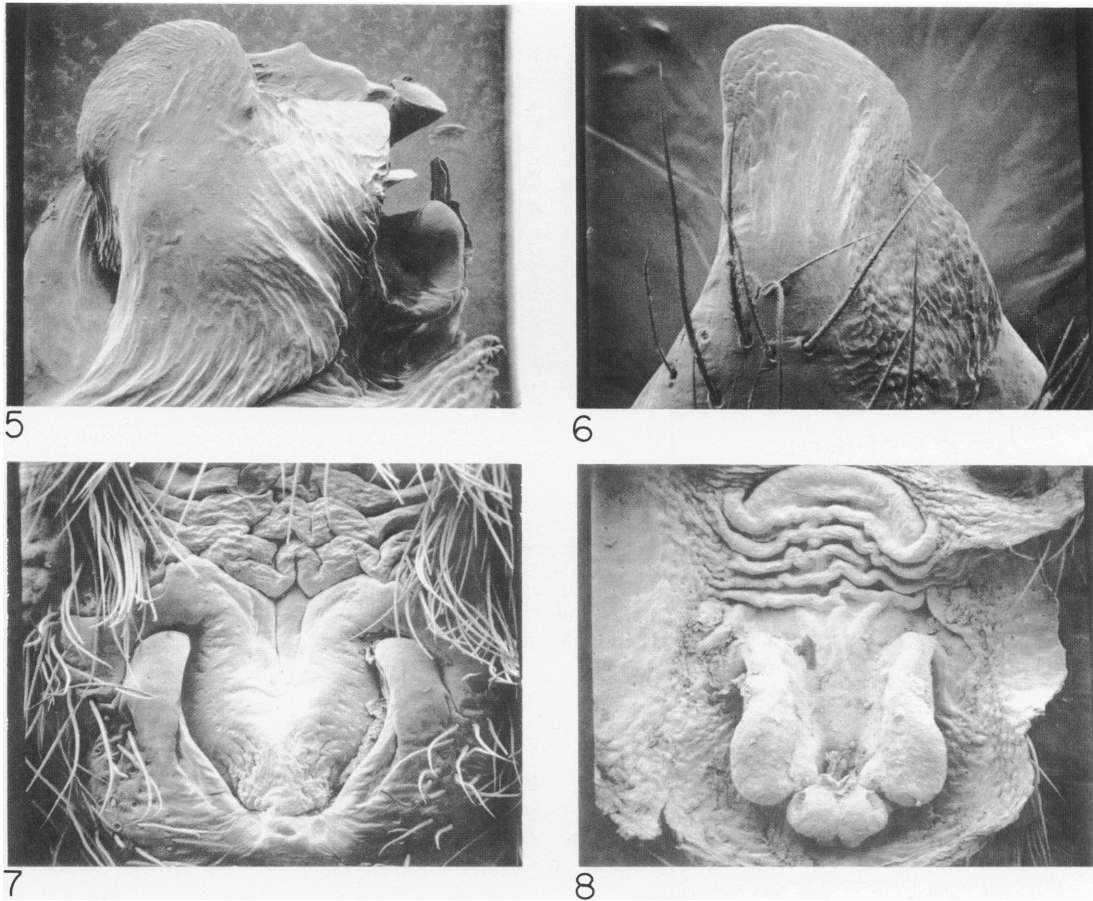


FIGS. 1-4. *Haplodrassus hiemalis* (Emerton). 1. Palp, ventral view. 2. Palp, dorsal view. 3. Epigynum, ventral view. 4. Vulva, dorsal view.

behind the terminal apophysis, but the shape of that apophysis is more similar to that of *Orodassus*. Moreover, *O. orites* differs from all other members of both genera in lacking a median apophysis and having a laterally expanded retrolateral tibial apophysis. The female genitalia of *O. orites* (figs. 105, 106) also combine the characteristic elements of both genera, namely the lateral arms of *Haplodrassus* (fig. 3) and the median projection of *Orodassus* (fig. 77), but again the structure of the spermathecae is totally unlike that of any other member of either genus. As in addition to the genitalic characters, *Haplodrassus* and *Orodassus* can be easily distinguished by the spacing of the posterior median eyes (closely approximate in *Haplodrassus*, separated by more than their diameter in *Orodassus*) and as *O. orites* can be unequivocally placed in *Orodassus* by that character, we have neither changed Chamberlin and Gertsch's placement of the species nor synonymized the two genera. *Orodassus orites* may be a relatively unmodified descendant of an ancestral stock that gave rise to both genera or merely an extremely divergent descendant of some ancestral *Orodassus* species.

Although the eye characters mentioned serve readily to separate *Haplodrassus* and *Orodassus*, neither of the two characters used for that purpose in a recent key to North American gnaphosid genera by Roth and Brown (1973) will do so. In couplet 14 of that key *Orodassus assimilis* (Banks) will key out to *Haplodrassus*, as both sexes lack ventral spines on tibia I, and male *Haplodrassus taibo* (Chamberlin) and both sexes of *O. orites* will not key out at all because they have, respectively, three and two pairs of ventral spines on tibia I. The eye measurements given in the species descriptions below show that the degree of separation of the lateral eyes, also used as a key character by Roth and Brown, frequently fails to accurately discriminate the two genera.

Although the shape of the retrolateral tibial apophysis is an excellent specific character in many groups of spiders, it does not appear to be so in *Haplodrassus* and *Orodassus*. Some pairs of species, such as *Haplodrassus bicornis* (fig. 24) and *Haplodrassus mimus* (fig. 48) or *Orodassus assimilis* (fig. 92) and *Orodassus canadensis* (fig. 100), have virtually identical apophyses, and some species, such as *Haplodrassus signifer* (figs.

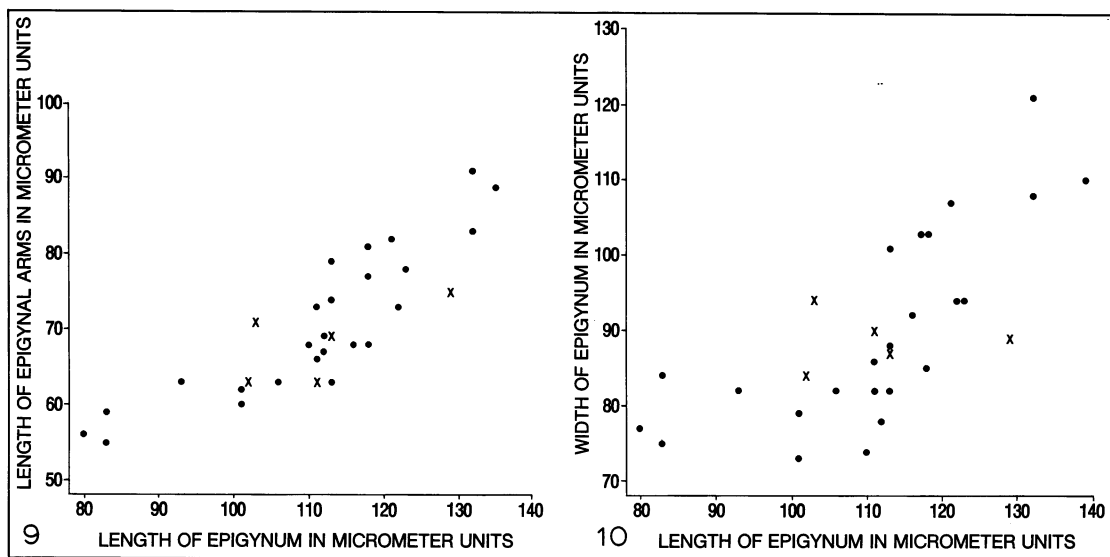


FIGS. 5-8. *Haplodrassus hiemalis* (Emerton), scanning electron micrographs. 5. Embolar region of palp, ventral view, 250X. 6. Retrolateral tibial apophysis, dorsal view, 250X. 7. Epigynum, ventral view, 125X. 8. Vulva, dorsal view, 100X.

16, 19, 20) and *O. coloradensis* (figs. 80, 83), show significant intraspecific differences in the shape of the apophysis. The epigyna show interspecific differences in all cases but in females that have mated they frequently bear hard amorphous plugs which must be removed before details of the structure can be seen.

Thanks to the work of Tullgren (1946) the north European *Haplodrassus* fauna is relatively well known, and we have been able to compare American and European species in detail. Chamberlin (1922) synonymized the American *Haplodrassus robustus* with the European *H. signifer*, and we agree that this is a Holarctic species. Based on genitalic characters each of the three

other species that occur in the eastern half of Canada seem to be sister species of forms occurring in northern Europe. These pairs, with the American species listed first, are *H. bicornis*-*H. umbratilis*, *H. hiemalis*-*H. moderatus*, and *H. eunis*-*H. soerenseni*. In the last case the genitalic differences separating the two species are so slight that cross-breeding experiments would be of great interest. Since *H. eunis* is not known to occur east of the Great Lakes there seems to be little possibility of direct genetic interchange between the American and European populations, and we have considered the two as separate, full species. The existence of an Alaskan record of *H. eunis* and an unconfirmed record of *H. soeren-*



FIGS. 9, 10. *Haplodrassus signifer* (C. L. Koch), epigynal measurements. 9. Proportional length of epigynal arms. 10. Proportional width of epigynal arms. Circles represent a random sample of 25 females from the United States, crosses the females from the type series of *H. dystactus* Chamberlin and Gertsch. See text for explanation.

seni from northern Russia makes it possible that circum-Pacific gene flow may occur.

The intercontinental relationships of *Haplodrassus* may differ significantly from those found in *Gnaphosa*. In that genus, each of the three known amphi-Atlantic species (*G. muscorum*, *G. microps*, and *G. orites*) are montane and Arctic tundra inhabitants with basically identical distributions in Arctic areas, the Rocky Mountains, and the mountains of northern New England (a new record of *G. orites* from an elevation of 11,000 feet on Table Mountain, Grand Teton National Park, Teton County, Wyoming, brings the distribution of that species [Platnick and Shadab, 1975, map 11] into accordance with that of the others). In *Haplodrassus*, however, the only known amphi-Atlantic species, *H. signifer*, is not found, so far as is known, in the American Arctic, but is common in lowland and southern areas (map 2). The two *Haplodrassus* that are found in Alaska and northern Canada (*H. hiemalis* and *H. eunis*; maps 1, 4) are apparently restricted to the New World, but may prove to be even closer to north Asian forms than to

European ones, or may even be identical with Siberian species. It is extremely unfortunate that no modern Siberian collections, particularly pit-fall trap collections from Arctic areas, are available to western workers; the North American *Haplodrassus* fauna may well prove to have more elements in common with the Asian fauna than with the European one.

The format of the descriptions and the standard abbreviations of morphological terms follow those used in Platnick and Shadab (1975). As in our previous collaborations, the senior author has been responsible for the taxonomic analysis and the preparation of the text, and the junior author for the illustrations. The 1850 adult *Haplodrassus* and 470 adult *Orodorassus* used in the present study were obtained from the large holdings of the American Museum of Natural History (AMNH) and the following curators and collectors, to each of whom we are grateful: Drs. D. Barr, Royal Ontario Museum; J. A. Beatty; D. E. Bixler; C. D. Dondale, Canadian National Collections; R. L. Fischer, Michigan State University; W. J. Gertsch; Å. Holm, Uppsala Universitet; D.

T. Jennings; B. J. Kaston; T. Kronstedt, Naturhistoriska Riksmuseet; H. W. Levi, Museum of Comparative Zoology (MCZ); W. B. Peck; M. Prokop, Field Museum of Natural History; R. X. Schick, formerly of the California Academy of Sciences; W. A. Shear; H. K. Wallace; F. R. Wanless, British Museum (Natural History); and H. V. Weems, Jr., Florida State Collection of Arthropods. We thank especially Drs. Bixler and Peck for their generous donations of the only known males of *Haplodrassus taibo* and *Orodrassus orites*, respectively; Dr. Levi for the loan of many types, without which this project would not have been possible; and Mr. R. J. Koestler of the American Museum of Natural History for his skilled assistance with the scanning electron microscope, a Cambridge Scientific Instruments Model S-4 purchased with the aid of a grant from the National Science Foundation.

HAPLODRASSUS CHAMBERLIN

Haplodrassus Chamberlin, 1922, p. 161 (type species by original designation *Drassus hiemalis* Emerton). Roewer, 1954, p. 398. Bonnet, 1957, p. 2087.

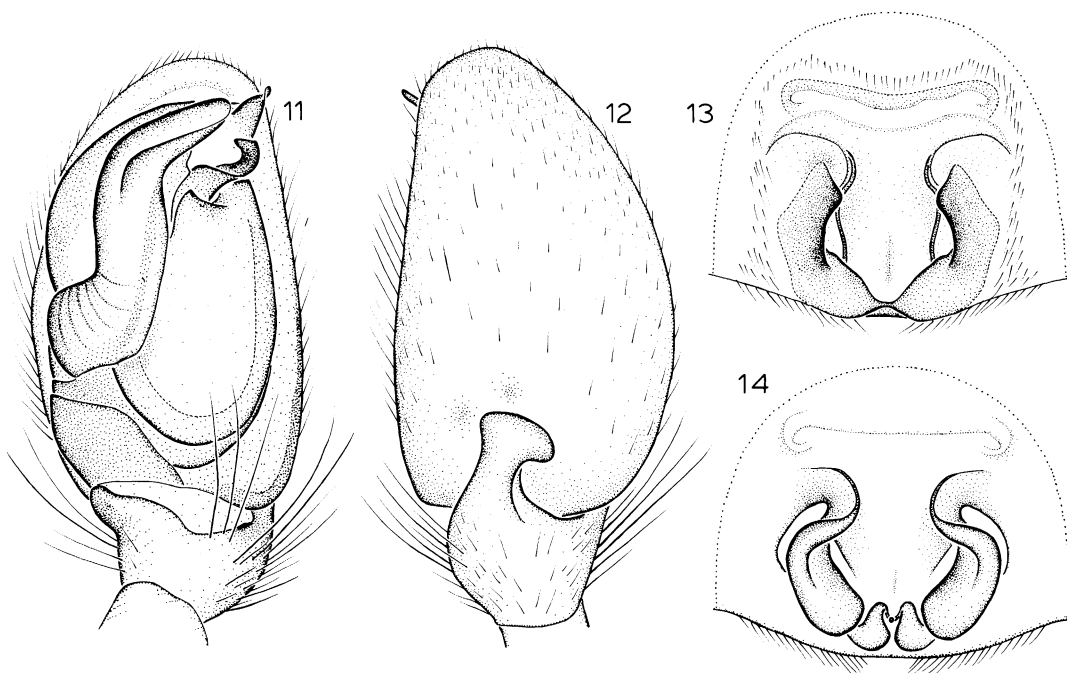
Diagnosis. *Haplodrassus* and *Orodrassus* can be distinguished from all other Nearctic drassodine gnaphosids by the combination of the following characters: metatarsal preening comb absent, trochanters only shallowly notched at most, cheliceral retromargin with two teeth, tibia IV without dorsal spines, and the posterior eye row only slightly procurved. Specimens belonging to *Haplodrassus* can be distinguished by the posterior median eyes being separated by their radius or less, by the flattened retrolateral tibial apophysis (figs. 2, 6) which is neither bifid nor laterally expanded but is often shifted dorsally, and by the absence of a median epigynal projection and the presence of paired lateral epigynal arms (figs. 3, 7).

Description. Total length 3-10 mm. Carapace an elongate oval, widest between coxae II and III, flattened, with ocular area narrowed, light brown posteriorly, darker anteriorly, with erect thin black setae. Cephalic area not elevated; thoracic groove longitudinal. From front, anterior eye row slightly procurved, posterior row

procurved. Anterior eyes circular, posterior median eyes irregularly triangular, posterior lateral eyes oval. Posterior median eyes usually largest. Anterior median eyes separated by slightly more than their diameter, by slightly less than their diameter from anterior laterals. Posterior median eyes usually separated by less than their radius, by their long diameter or more from posterior laterals. Lateral eyes separated by their diameter or less. Median ocular quadrangle roughly square. Clypeal height greater than anterior median eye diameter. Chelicerae with two or three promarginal teeth and two retromarginal teeth. Endites medially excavate, with serrula. Labium wide, triangular. Sternum rounded, strongly rebordered. Leg formula 4123. Typical leg spination pattern (only surfaces bearing spines listed): femora: I, II d1-1-0, p0-0-1; III d1-1-0, p0-0-1, r0-0-1; IV d1-1-0, r0-0-1; tibiae: III p1-1-1, v2-2-2, r0-1-1; IV p1-0-1, v2-2-2, r1-1-1; metatarsi: I, II v2-0-0; III p0-2-2, v2-0-2, r0-1-2; IV p0-2-2, v2-1-2, r0-2-2. Legs light brown, distal segments darkest. Tarsi with light scopulae, two dentate claws, and claw tufts. Metatarsal preening comb lacking. Trochanters at most only shallowly notched. Distal leg segments with dorsal trichobothria. Abdomen light gray with conspicuous anterior tuft of hairs, sometimes with dark chevron pattern. Six spinnerets, anteriors widely separated, with four to six spigots. Palp with thick dorsoapical embolus, large medially situated terminal apophysis, and recurved median apophysis. Retrolateral tibial apophysis flattened, not bifid or laterally expanded, often shifted dorsally. Epigynum with anterior ridges (sometimes hoodlike) and large paired lateral arms separated by median septum. Spermathecae not distinctly separated from cuticle.

Misplaced Species. As noted by Ubick and Roth (1973), the presence of a metatarsal preening comb indicates that *Haplodrassus magister* Chamberlin (1933) belongs to the *Zelotes-Chrassyllus* complex rather than to *Haplodrassus*.

Uncertain Names. The following two species, transferred to *Haplodrassus* by Chamberlin (1922), are here considered *nomina dubia* as they are too poorly illustrated to be recognized: *Prosthesima barberi* Banks (1902), type lost, and *Zelotes pacifica* Banks (1904), type destroyed.

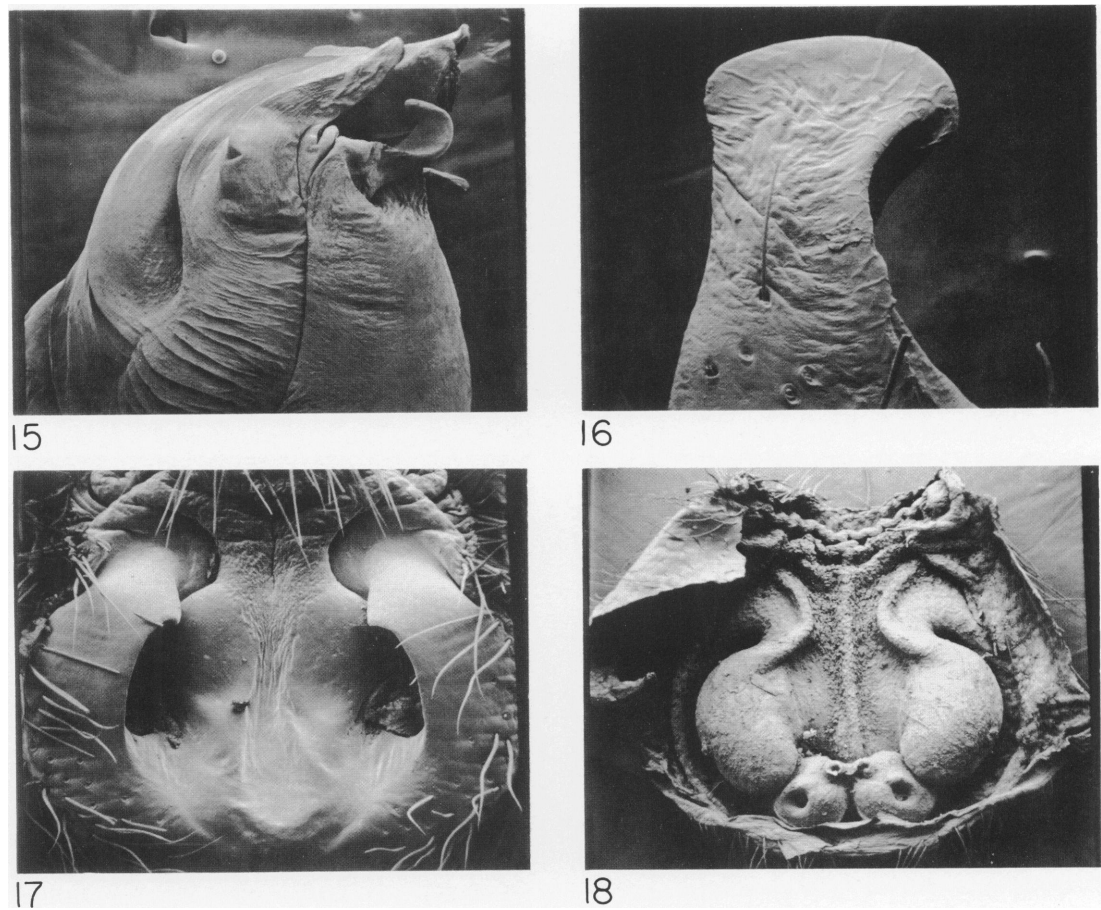


FIGS. 11-14. *Haplodrassus signifer* (C. L. Koch). 11. Palp, ventral view. 12. Palp, dorsal view. 13. Epigynum, ventral view. 14. Vulva, dorsal view.

KEY TO SPECIES OF *HAPLODRASSUS* IN AMERICA

1. Males 2
Females 10
2. Retrolateral tibial apophysis shifted dorsally
(as in fig. 2) 4
Retrolateral tibial apophysis not shifted dor-
sally, actually situated laterally (figs. 64,
72) 3
3. Retrolateral tibial apophysis expanded at
base (fig. 72) *taibo*
Retrolateral tibial apophysis uniform in
width throughout (figs. 64, 68)
..... *chamberlini*
4. Terminal apophysis with distinct ridge (figs.
11, 39, 47, 55) 5
Terminal apophysis without distinct ridge
(figs. 1, 23, 31) 8
5. Ridge of terminal apophysis reaching to
or beyond tip of terminal apophysis
(figs. 39, 47) 6
Ridge of terminal apophysis not reaching to
tip of terminal apophysis (figs. 11, 55) . 7
6. Ridge of terminal apophysis wider than
terminal apophysis (figs. 47, 51) . . *mimus*

- Ridge of terminal apophysis narrower than
terminal apophysis (figs. 39, 43). *dixiensis*
7. Terminal apophysis relatively long (figs. 11,
15) *signifer*
Terminal apophysis relatively short (figs. 55,
59) *maculatus*
8. Retrolateral tibial apophysis narrowed at tip
(figs. 2, 6) *hiemalis*
Retrolateral tibial apophysis expanded at tip
(figs. 24, 32) 9
9. Terminal apophysis relatively narrow (figs.
31, 35) *eunis*
Terminal apophysis relatively wide (figs. 23,
27) *bicornis*
10. Lateral arms of epigynum free anterolater-
ally (figs. 25, 29) *bicornis*
Lateral arms of epigynum fused to cuticle
anterolaterally (as in fig. 13) 11
11. Lateral arms of epigynum with distinct pro-
jections toward midline (figs. 13, 17) . . .
..... *signifer*
Lateral arms of epigynum without distinct
projections toward midline (as in fig. 33)
..... 12
12. Median epigynal septum distinctly invagi-
nated anteriorly (figs. 3, 33) 13



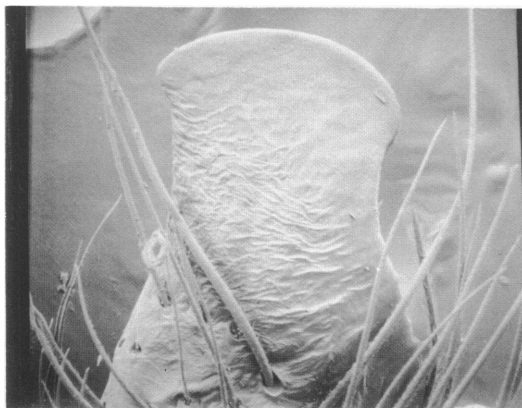
FIGS. 15-18. *Haplodrassus signifer* (C. L. Koch), scanning electron micrographs. 15. Embolar region of palp, ventral view, 120X. 16. Retrolateral tibial apophysis, dorsal view, 260X. 17. Epigynum, ventral view, 115X. 18. Vulva, dorsal view, 65X.

- Median epigynal septum not distinctly invaginated anteriorly (as in fig. 49). . . . 14
- 13. Lateral arms of epigynum sinuous (figs. 3, 7) *hiemalis*
- Lateral arms of epigynum angular (figs. 34, 38) *eunis*
- 14. Median epigynal septum relatively wide (figs. 49, 57). 15
- Median epigynal septum relatively narrow (figs. 41, 65, 73) 16
- 15. Spermathecae relatively narrow (figs. 50, 54) *mimus*
- Spermathecae relatively wide (figs. 58, 62) *maculatus*
- 16. Epigynum with distinct hoodlike anterior ridge (figs. 65, 73) 17

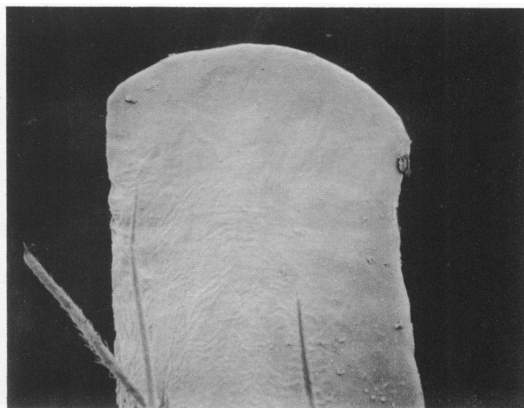
- Epigynum without distinct hoodlike anterior ridge (figs. 41, 45) *dixiensis*
- 17. Epigynum with broad secondary ridge behind anterior ridge (fig. 73) *taibo*
- Epigynum without broad secondary ridge behind anterior ridge (figs. 65, 69) *chamberlini*

Haplodrassus hiemalis (Emerton)
 Figures 1-8; Map 1

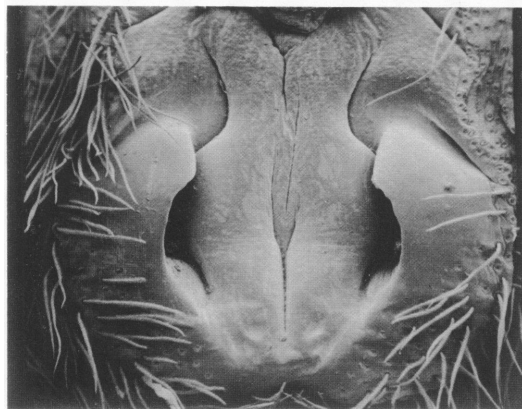
Drassus hiemalis Emerton, 1909, p. 218, pl. 9, figs. 1, 1a-1d (male and female syntypes from Three Mile Island, Lake Winnepesaukee, Carroll County, New Hampshire, in MCZ, examined).



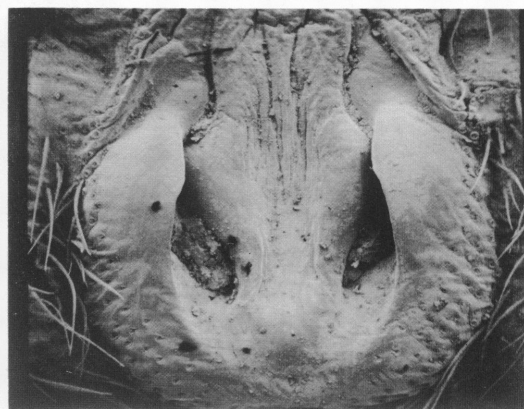
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FIGS. 19-22. *Haplodrassus signifer* (C. L. Koch), scanning electron micrographs. 19, 20. Retrolateral tibial apophyses, dorsal views. 19. Variant from Cochise County, Arizona, 250 \times . 20. Variant from Emery County, Utah, 490 \times . 21, 22. Epigyna, ventral views, 100 \times . 21. Variant from Salt Lake County, Utah. 22. Variant from México, Mexico.

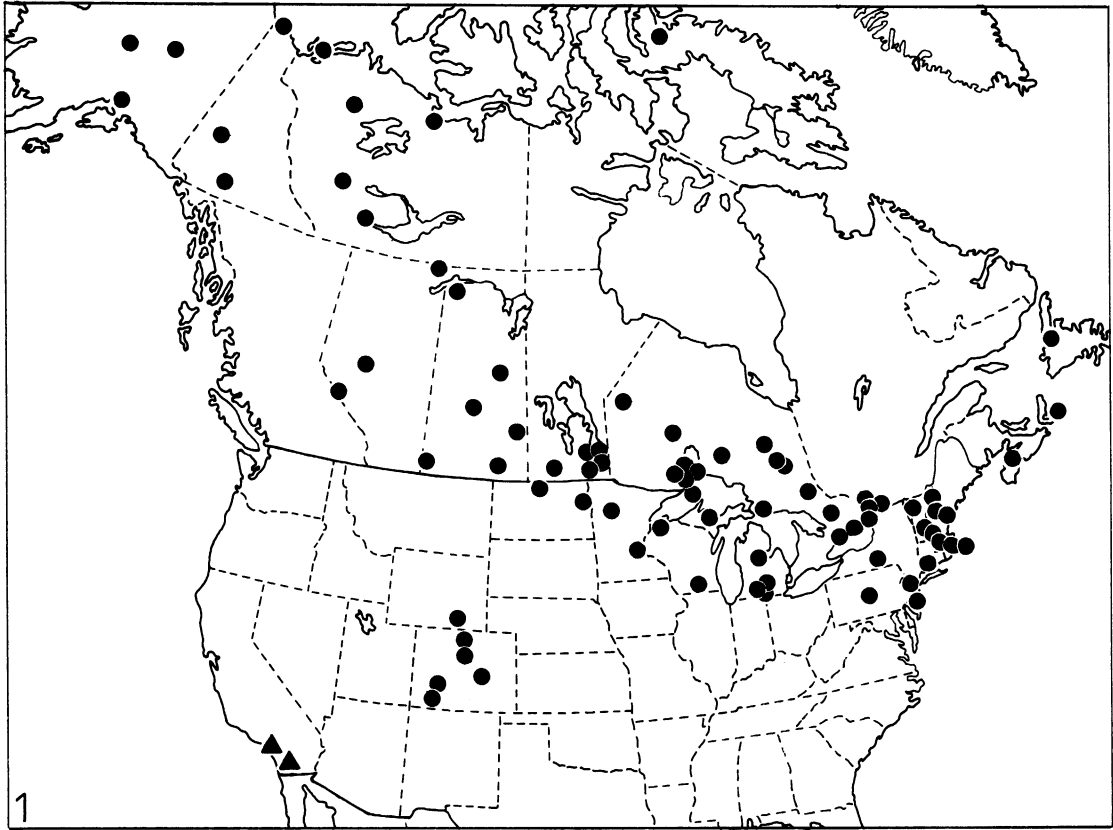
Haplodrassus hiemalis: Chamberlin, 1922, p. 161. Roewer, 1954, p. 403. Bonnet, 1957, p. 2090.

Haplodrassus altanus Chamberlin, 1933, p. 5, figs. 8, 9 (male holotype from east of Fitzgerald, Alberta, Canada, in AMNH, examined; not female allotype, =*signifer*; first synonymized by Ubick and Roth, 1973). Roewer, 1954, p. 403. Bonnet, 1957, p. 2088.

Diagnosis. *Haplodrassus hiemalis* is closest to the European species *H. moderatus* (Kulczyński), from which it may be distinguished by the much larger terminal apophysis and invaginated epigy-

nal septum (Tullgren, 1946, figs. 214-216). Both the palp (figs. 1, 5) and epigynum (figs. 3, 7) of *H. hiemalis* are distinctive, and the species is unlikely to be confused with any other American form.

Male. Total length 5.92 \pm 0.33 mm. Carapace 2.60 \pm 0.12 mm. long, 2.07 \pm 0.09 mm. wide. Femur II 1.74 \pm 0.10 mm. long (98 specimens examined). Eye sizes and interdistances (mm.): AME 0.09, ALE 0.12, PME 0.12, PLE 0.09; AME-AME 0.12, AME-ALE 0.04, PME-PME 0.05, PME-PLE 0.17, ALE-PLE 0.07. MOQ length 0.33 mm., front width 0.31 mm., back



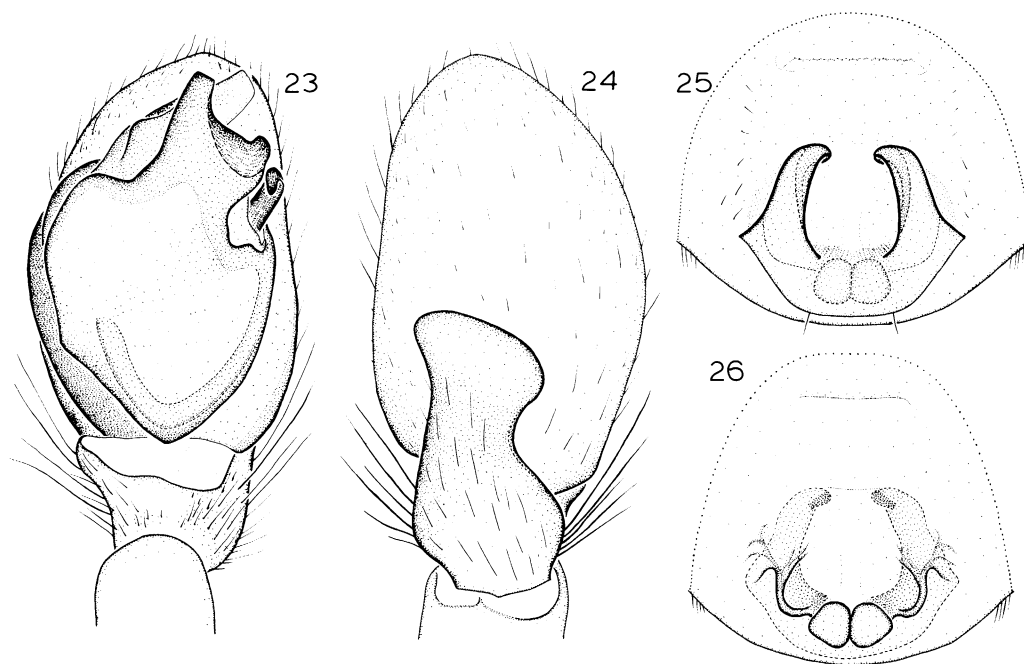
MAP 1. North America, showing distribution of *Haplodrassus hiemalis* (circles) and *H. taibo* (triangles).

width 0.29 mm. Terminal apophysis greatly enlarged, with protruding prolateral knob (figs. 1, 5). Retrolateral tibial apophysis triangular (figs. 2, 6). Leg spination: femur III p0-1-1, r0-1-1; patella III r0-1-0; tibiae III, IV v1-2-2; metatarsi: I v0-0-0; IV p1-2-2, v2-2-2, r1-2-2.

Female. Total length 6.49 ± 0.64 mm. Carapace 2.70 ± 0.29 mm. long, 2.10 ± 0.19 mm. wide. Femur II 1.65 ± 0.15 mm. long (282 specimens examined). Eye sizes and interdistances (mm.): AME 0.11, ALE 0.12, PME 0.14, PLE 0.11; AME-AME 0.18, AME-ALE 0.08, PME-PME 0.10, PME-PLE 0.21, ALE-PLE 0.10. MOQ length 0.44 mm., front width 0.40 mm., back width 0.38 mm. Epigynal septum with anterior invagination (figs. 3, 7). Spermathecae expanded at base (figs. 4, 8). Leg spination: femur III p0-

1-1, r0-1-1; patella III r0-1-0; tibiae III, IV v1-2-2; metatarsus IV p1-2-2, v1-2-2.

Records. **Canada:** **Alberta:** E Fitzgerald; Jasper; White Court. **Franklin:** 7 mi. SE Tunnek Point. **Mackenzie:** Coppermine; 40 mi. NW Enterprise; Lac Maunoir; 20 mi. E Tuktoyaktuk; Wrigley. **Manitoba:** Agassiz; Darwin; 1 mi. W Elm Creek; Picnic Bog; Pine Falls; Rennie; Riverton; Spruce Woods Provincial Park; Telford; Winnipeg. **Newfoundland:** Humber River. **Nova Scotia:** Cow Bay; Kentville. **Ontario:** Algonquin Provincial Park; Black Sturgeon Lake; Chaffey's Locks; Chatterton; Cochrane; Favourable Lake; Inwood Provincial Park; W Iron Bridge; Klotz Lake; Sproule Bay, Lake Opeongo; Lake Timagami; Nipigon; Odessa; Constance Bay, Ottawa; 22 mi. S Pickle Lake; Port Arthur; Port Credit; Smoky



FIGS. 23-26. *Haplodrassus bicornis* (Emerton). 23. Palp, ventral view. 24. Palp, dorsal view. 25. Epigynum, ventral view. 26. Vulva, dorsal view.

Falls; 7 mi. E Smooth Rock Falls; Stirling; 19 mi. S Timagami. *Quebec*: King Mountain, Gatineau National Park. *Saskatchewan*: Cypress Hills Provincial Park; Lac La Ronge; Lady Lake; E William River, Lake Athabasca; 2 mi. N Laura; E Montmartre; Reserve; 8, 13 mi. E Saskatoon. *Yukon*: Herschel; Minto; Whitehorse. **United States**: *Alaska*: Fairbanks; Lake Telida; Palmer. *Colorado*: Clear Creek Co.: Georgetown; Mt. Evans. El Paso Co.: Pike's Peak. Gunnison Co.: East Maroon Pass; Conundrum Pass, Pearl Pass, Elk Mountains; Cottonwood Pass, Sawatch Mountains. Hinsdale Co.: 2 mi. N Slumgullion Pass, San Juan Mountains. Larimer Co.: Trail Ridge Road, Rocky Mountain National Park. *Connecticut*: Fairfield Co.: Ridgefield. New Haven Co.: Seymour. *Maine*: York Co.: Hollis Center. *Massachusetts*: Barnstable Co.: Provincetown. Essex Co.: Topsfield. Middlesex Co.: Concord; Groton; Holliston; Lexington; Walden Pond. Norfolk Co.: Blue Hills. Plymouth Co.: Ellisville; Monponsett. Worcester Co.: Grafton. *Michigan*: Calhoun Co.: Cooper's Marsh, Hall's

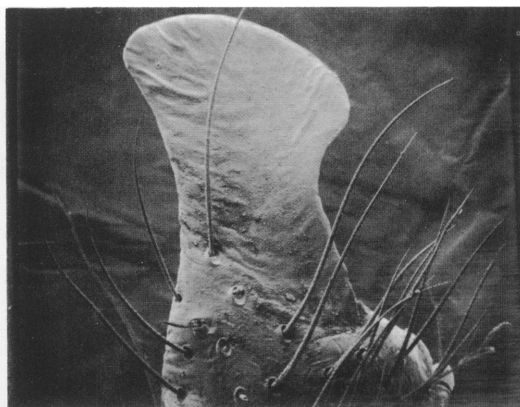
Lake, Albion. Hillsdale Co.: Mosherville. Ingham Co.: East Lansing. Kalamazoo Co.: Gull Lake Biological Station. Keweenaw Co.: Isle Royale. Marquette Co.: Midland Co. *Minnesota*: Clearwater Co.: Itasca Park. Ramsey Co.: St. Paul. *New Hampshire*: Carroll Co.: Jackson; Three Mile Island, Lake Winnepesaukee. Cheshire Co.: Surry. Coos Co.: Randolph; Mt. Washington. *New Jersey*: Bergen Co.: Ramsey. Morris Co.: Kinnelon. Ocean Co.: Lakehurst. *New York*: Tompkins Co.: Ithaca; McLean. *North Dakota*: Bottineau Co. Grand Forks Co.: Grand Forks. *Pennsylvania*: Centre Co.: State College. *Vermont*: Chittenden Co.: Mt. Mansfield. Windsor Co.: Hartland. *Wisconsin*: Bayfield Co.: Port Wing. Dane Co.: Madison. *Wyoming*: Carbon Co.: Bridger Peak.

Distribution. Alaska and Newfoundland south to Colorado and New Jersey (map 1).

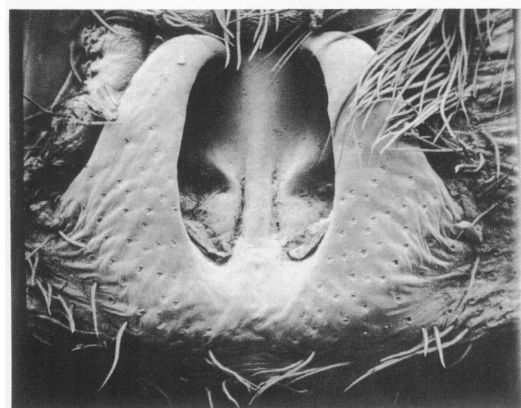
Natural History. Mature males have been taken from mid-April through late July, mature females year round. Specimens have been collected at elevations up to 14,000 feet, in pitfall



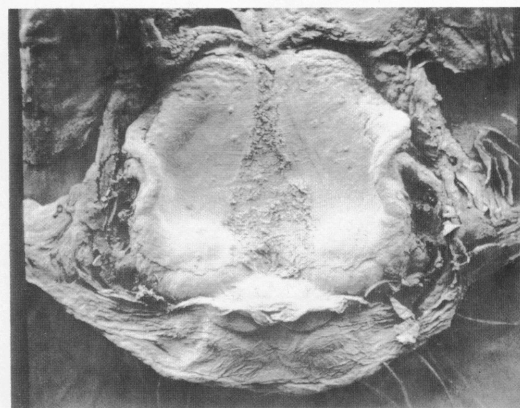
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FIGS. 27-30. *Haplodrassus bicornis* (Emerton), scanning electron micrographs. 27. Embolar region of palp, ventral view, 250 \times . 28. Retrolateral tibial apophysis, dorsal view, 125 \times . 29. Epigynum, ventral view, 125 \times . 30. Vulva, dorsal view, 125 \times .

traps in hardwood forests, marshes, swamps, and grass, in wasp trap nests, by vacuum, on beaches, by sifting leaf litter, and associated with spruces, firs, lodgepole and jack-pines, cedars, birches, aspens, oaks, maples, willows, and sedges.

Haplodrassus signifer (C. L. Koch)

Figures 9-22; Map 2

Drassus signifer C. L. Koch, 1839, p. 31, fig. 452 [female holotype from mountains near Karlsbad, Bohemia, Czechoslovakia, may be in British Museum (Natural History) or Zoologisches Museum an der Humboldt-Universität zu Berlin, not examined].

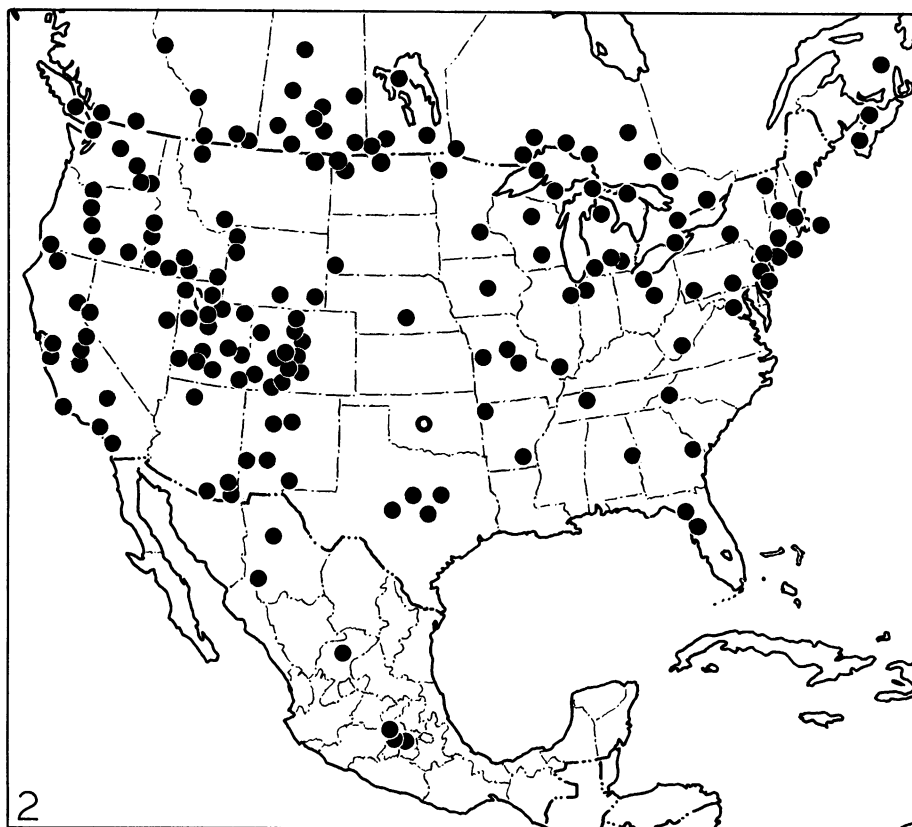
Drassus robustus Emerton, 1890, p. 179, pl. 4, figs. 8, 8a-8c (male and female syntypes from Medford, Middlesex County, Massachusetts, in MCZ, examined; first synonymized by Chamberlin, 1922).

Teminius nigriceps Banks, 1895, p. 421 (female holotype from Fort Collins, Larimer County, Colorado, in MCZ, examined; first synonymized with *signifer* by Chamberlin, 1922).

Drassus placidus Banks, 1896, p. 63 (female holotype from Ames, Story County, Iowa, in MCZ, examined; first synonymized with *signifer* by Chamberlin, 1922).

Syrisca nigriceps: Simon, 1897, p. 129.

Drassodes ferrum-equinum F. O. P.-Cambridge, 1899, p. 60, pl. 4, fig. 12 [female holotype



MAP 2. North America, showing distribution of *Haplodrassus signifer*; open symbol indicates a state record only.

from Amula, Guerrero, Mexico, in British Museum (Natural History), examined]. Roewer, 1954, p. 396. Bonnet, 1956, p. 1565 (*ferrequinus*, emendation). NEW SYNONYMY.

Prosthesima decepta Banks, 1900, p. 531 (two female syntypes from Auburn, Lee County, Alabama, in MCZ, examined; first synonymized with *signifer* by Chamberlin, 1922).

Drassodes robustus: Banks, 1901, p. 572.

Zelotes decepta: Scheffer, 1906, p. 123.

Haplodrassus signifer: Chamberlin, 1922, p. 162. Roewer, 1954, p. 402. Bonnet, 1957, p. 2091.

Haplodrassus altanus (misidentification): Chamberlin, 1933, p. 5, fig. 10 (female allotype only).

Haplodrassus dystactus Chamberlin and Gertsch, 1940, p. 8, figs. 6, 9, 10 (male holotype and female allotype from Gunnison Butte, Green

River, Emery County, Utah, in AMNH, examined). Roewer, 1954, p. 403. NEW SYNONYMY.

Note. Only American synonyms and combinations are cited above. We have not checked the numerous European synonyms and combinations of this widespread and abundant Holarctic species. A complete synonymy can be found in Bonnet (1957, pp. 2091-2095).

Diagnosis. *Haplodrassus signifer* is a distinctive species which seems to be without close relatives in northern Europe or America. It is easily recognized by the long ridge on the terminal apophysis (figs. 11, 15) and the broad, concave lateral arms of the epigynum (figs. 13, 17). The only American form with which *H. signifer* could be confused is *H. maculatus*, but it differs from that

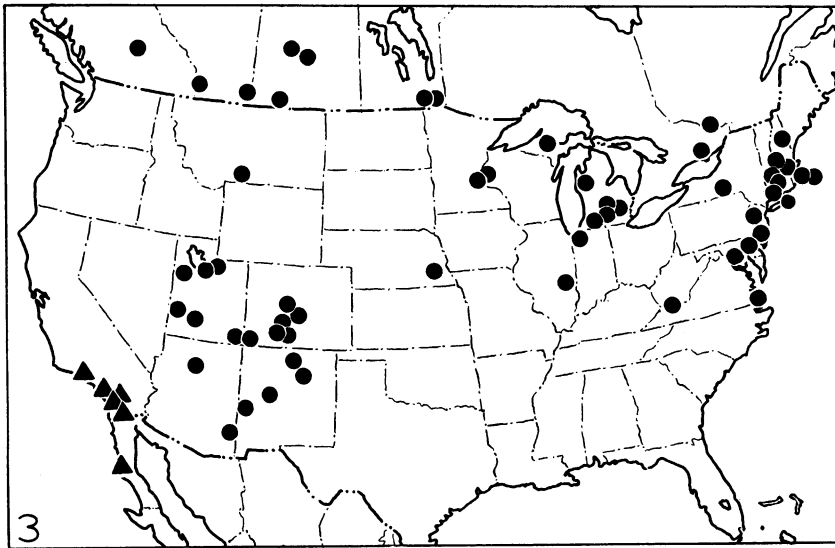
species by the much longer terminal apophysis and the much larger lateral arms of the epigynum.

Male. Total length 6.51 ± 0.47 mm. Carapace 2.90 ± 0.23 mm. long, 2.26 ± 0.17 mm. wide. Femur II 1.92 ± 0.16 mm. long (408 specimens examined). Eye sizes and interdistances (mm.): AME 0.10, ALE 0.11, PME 0.18, PLE 0.10; AME-AME 0.12, AME-ALE 0.08, PME-PME 0.05, PME-PLE 0.18, ALE-PLE 0.13. MOQ length 0.42 mm., front width 0.32 mm., back width 0.41 mm. Terminal apophysis long, with long ridge (figs. 11, 15). Retrolateral tibial apophysis variable, usually greatly indented below tip (figs. 12, 16) but often only slightly indented (fig. 19) or not at all indented (fig. 20) in specimens from the southwestern United States. Leg spination: metatarsi: I v0-0-0; III v2-1-2, r0-2-2.

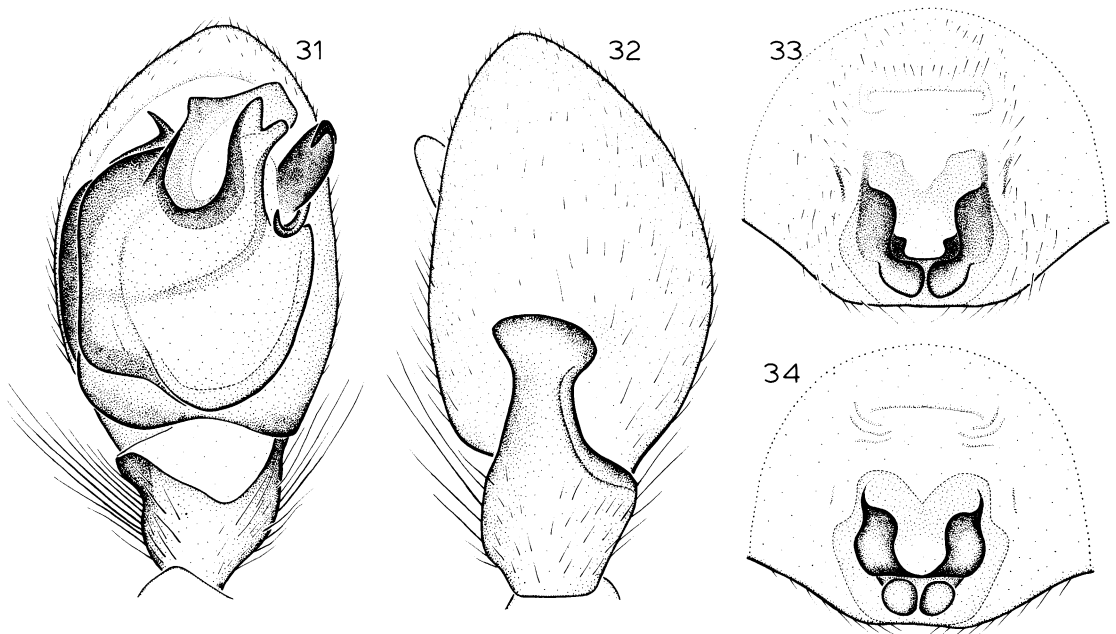
Female. Total length 7.18 ± 0.89 mm. Carapace 2.84 ± 0.30 mm. long, 2.20 ± 0.25 mm. wide. Femur II 1.76 ± 0.18 mm. long (466 specimens examined). Eye sizes and interdistances (mm.): AME 0.12, ALE 0.10, PME 0.14, PLE 0.10; AME-AME 0.12, AME-ALE 0.04, PME-PME 0.05, PME-PLE 0.18, ALE-PLE 0.13. MOQ length 0.39 mm., front width 0.35 mm., back width 0.34 mm. Epigynal arms broad, concave

(figs. 13, 17), somewhat shortened in some specimens from the southwestern United States (fig. 21), greatly shortened in specimens from central Mexico (fig. 22). Spermathecae greatly elongated anteriorly, sinuous (figs. 14, 18). Leg spination: metatarsus I v0-0-0.

Records. **Canada:** *Alberta:* Etzikom; Foremost; Sunwapta Pass, Jasper National Park; 4 mi. W Lake Louise; Waterton Lakes National Park. *British Columbia:* Vaseaux Lake, Oliver; Vancouver; Wellington, Vancouver Island; Westbank. *Manitoba:* 23 mi. E Brandon; Cedar Lake; Oak Lake; 10 mi. E Winnipeg. *Nova Scotia:* Canard; Digby; Halls Harbour. *Ontario:* 30-50 mi. E Belleville; Black Sturgeon Lake; Chatterton, 13 mi. N Belleville; Cochrane; Gregoire Mills; Gunther; 20 mi. E Kenora; Sproule Bay, Lake Opeongo; Long Point; Square Bay, Manitoulin Island; 15 mi. W Marathon; Mer Bleue; Odessa; Port Credit; Raith; Rednersville; 7 mi. S Timagami; Toronto; Wawa. *Quebec:* Brion Island, Gulf of Saint Lawrence. *Saskatchewan:* Big River; Buffalo Pound Provincial Park; Cudworth; Grenfell; Lady Lake; McLean; Moose Jaw; Mortlach; Pasqua; Skull Creek, 6 mi. E Piapot; Regina; 8 mi. E Saskatoon; Val Marie. **United States** (county records only): *Alabama:* Lee. *Arizona:* Cochise,



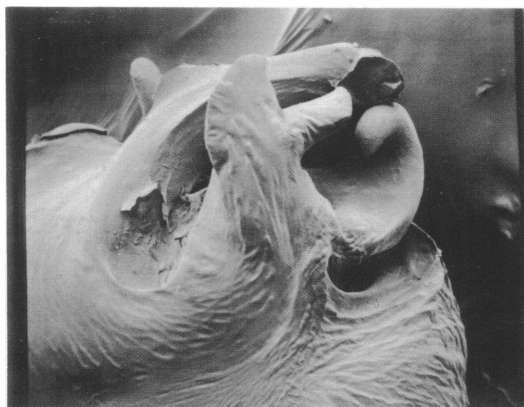
MAP 3. North America, showing distribution of *Haplodrassus bicornis* (circles) and *H. maculatus* (triangles).



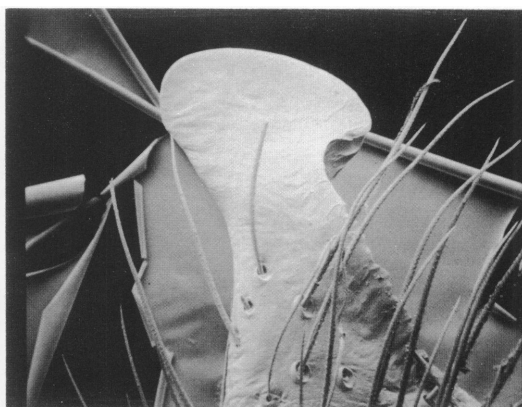
FIGS. 31-34. *Haplodrassus eunis* Chamberlin. 31. Palp, ventral view. 32. Palp, dorsal view. 33. Epigynum, ventral view. 34. Vulva, dorsal view.

Coconino, Graham, Pima. *Arkansas*: Benton, Bradley, Carroll, Washington. *California*: Contra Costa, Fresno, Los Angeles, Mariposa, Mono, Orange, San Diego, Santa Barbara, Santa Clara, Santa Cruz, Sierra, Siskiyou, Tulare. *Colorado*: Archuleta, Boulder, Chaffee, Clear Creek, Conejos, Custer, Douglas, El Paso, Fremont, Gunnison, Jefferson, Larimer, Mineral, Rio Blanco, Rio Grande, Saguache, San Juan, San Miguel. *Connecticut*: Fairfield, Hartford, New Haven. *District of Columbia*. *Florida*: Hernando, Levy. *Georgia*: Screven. *Idaho*: Ada, Bear Lake, Blaine, Canyon, Cassia, Payette, Twin Falls, Washington. *Illinois*: Jackson, Kankakee. *Indiana*: Porter. *Iowa*: Story. *Maine*: Cumberland. *Massachusetts*: Barnstable, Bristol, Middlesex, Nantucket, Norfolk. *Michigan*: Calhoun, Chippewa, Clinton, Ingham, Kalamazoo, Keweenaw, Livingston, Marquette, Midland, Otsego. *Minnesota*: Hennepin, Marshall. *Missouri*: Cole, Johnson, Phelps. *Montana*: Daniels, Flathead, Gallatin. *Nebraska*: Buffalo. *Nevada*: Washoe, White Pine. *New Hampshire*: Carroll, Cheshire. *New Jersey*: Bergen,

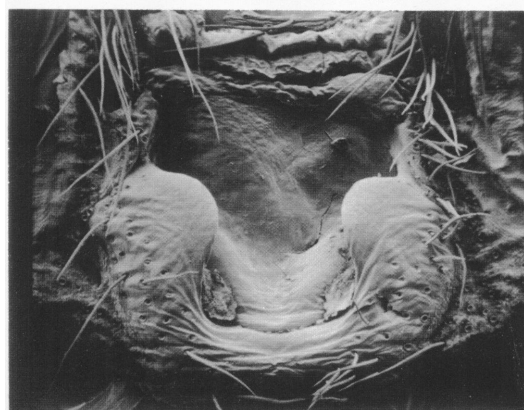
Hunterdon, Middlesex, Ocean. *New Mexico*: Bernalillo, Catron, Otero, Santa Fe, Socorro, Taos. *New York*: Nassau, Orange, Suffolk, Tompkins. *North Carolina*: Buncombe. *North Dakota*: Bottineau, Divide, Mountrail. *Ohio*: Erie, Knox. *Oklahoma*: state record only. *Oregon*: Deschutes, Harney, Hood River, Jefferson, Josephine, Lake, Union. *Pennsylvania*: Adams, Bucks, Westmoreland. *South Dakota*: Custer. *Tennessee*: Humphreys. *Texas*: Brown, McClenan, Tom Green, Travis. *Utah*: Beaver, Box Elder, Carbon, Daggett, Emery, Garfield, Grant, Morgan, Piute, Salt Lake, San Juan, Sevier, Summit, Tooele, Utah, Weber. *Vermont*: Chittenden, Windham, Windsor. *Virginia*: Fairfax. *Washington*: Asotin, Chelan, Franklin, Grant, San Juan, Whitman. *West Virginia*: Summers. *Wisconsin*: Dane, Lincoln. *Wyoming*: Carbon, Platte, Teton, Yellowstone National Park. *Mexico*: *Chihuahua*: Barranca Derio, Batopilas; Cañon Prieta. *Distrito Federal*: Contreras. *México*: Km. 125, Highway 71; Crater del Nevado de Toluca. *Zacatecas*: 2 mi. E Villa Insurgentes.



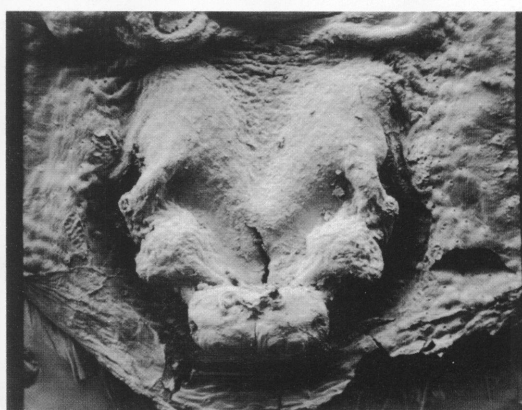
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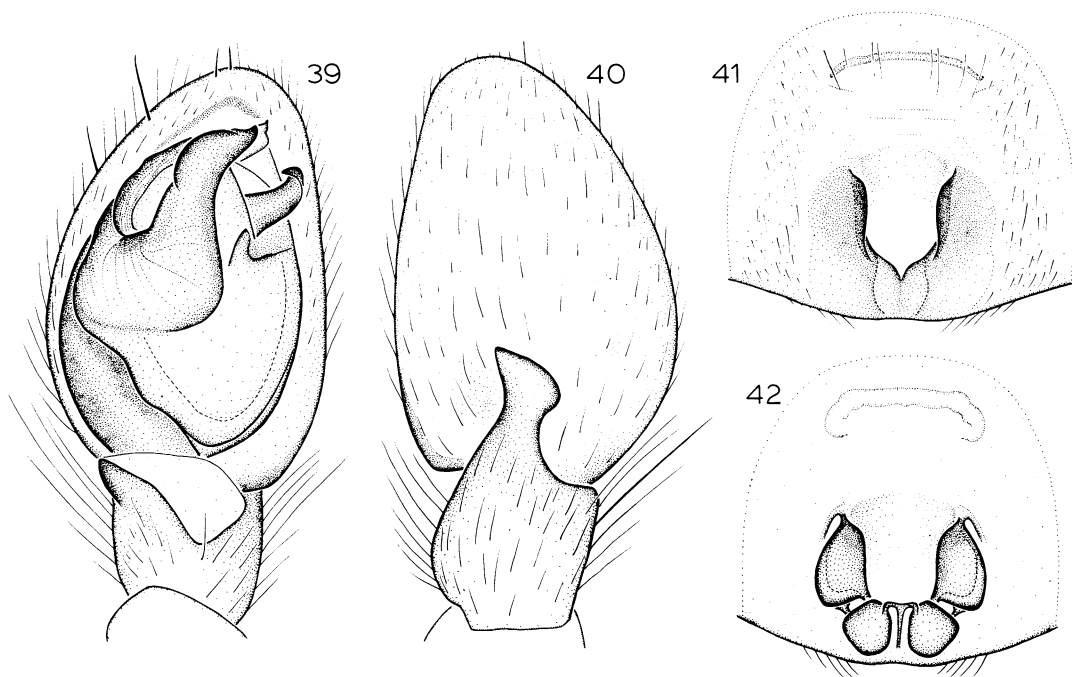
FIGS. 35-38. *Haplodrassus eunis* Chamberlin, scanning electron micrographs. 35. Embolar region of palp, ventral view, 260 \times . 36. Retrolateral tibial apophysis, dorsal view, 260 \times . 37. Epigynum, ventral view, 130 \times . 38. Vulva, dorsal view, 130 \times .

Distribution. British Columbia and Nova Scotia south to central Mexico (map 2). Also in Europe.

Natural History. Mature males and females have been taken year round (primarily during the summer in northern areas). Specimens have been collected at elevations between 1000 and 13,800 feet (the highest altitude records are from central Mexico), in pitfall traps in grass, wheat fields, deciduous and coniferous forests, sand blowouts, and gravel pits, under stones, logs, and shore debris, associated with firs, lodgepole pines, junipers, black spruces, aspens, birches, oaks, pop-

lars, willows, apples, roses, ephedra, sagebrush, and sphagnum, in houses, in malt and molasses traps, and from a nest of the ant *Formica integra* Nylander.

Variation and Synonymy. *Haplodrassus dystactus* Chamberlin and Gertsch was established on rather tenuous grounds. Those authors found no differences in the palpal bulb that would separate *dystactus* from *signifer*, but used the lack of an invagination below the tip of the retrolateral tibial apophysis to distinguish males of the former species. Although it is true that males with these straight-sided apophyses (fig. 20) oc-



FIGS. 39-42. *Haplodrassus dixiensis* Chamberlin and Woodbury. 39. Palp, ventral view. 40. Palp, dorsal view. 41. Epigynum, ventral view. 42. Vulva, dorsal view.

cur only in the southwestern United States, numerous intermediate males (fig. 19) from the same area are in collections, and we have not been able to separate the populations by this character. Similarly, Chamberlin and Gertsch detected no basic structural differences in the female genitalia but thought the lateral arms of the epigynum proportionally shorter and wider in *dystactus*. In an effort to document these differences the total length of the epigynum and the length and width of the lateral arms were measured on a random sample of 25 females from the United States and on the five females (the allotype and four paratypes) included in the type series of *dystactus*. When plotted (figs. 9, 10), these results indicated that *dystactus* does not represent an extreme of variation in either the proportional length or the proportional width of the lateral arms. It is certainly true that the populations in the southwestern United States have diverged to some extent from the remainder of the species; visual inspection indicates that the population in central Mexico (including the holo-

type of *Drassodes ferrum-equinum*) is even more divergent in the proportions of the lateral epigynal arms (fig. 22). The lack of males from central Mexico and the absence of biological data on the breeding habits of these spiders anywhere in their range makes an absolute judgment on the status of these populations impossible. We believe that the morphological evidence indicates that gene flow probably exists between all these populations, and we have therefore synonymized *dystactus* and *ferrum-equinum* with *signifer*. It should be pointed out that if subsequent evidence indicates that the southwestern populations are distinct, the correct name for them would be *Haplodrassus nigriceps* (Banks), as the female holotype of that species has relatively short lateral epigynal arms.

Haplodrassus bicornis (Emerton)

Figures 23-30; Map 3

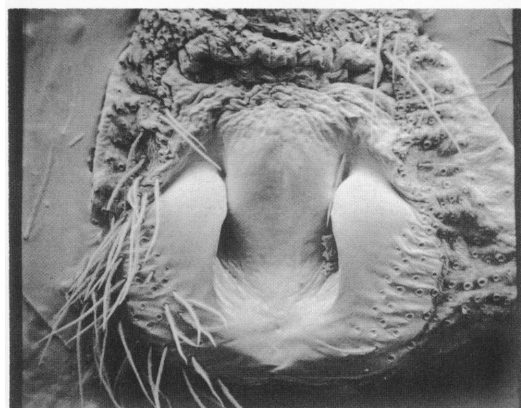
Drassus bicornis Emerton, 1909, p. 218, pl. 9, figs. 2, 2a, 2b (male and female syntypes from Three Mile Island, Lake Winnepesaukee, Car-



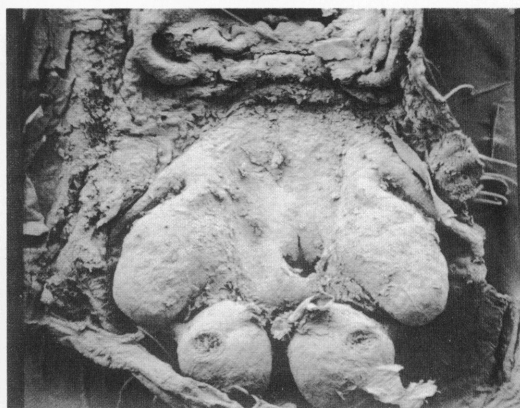
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FIGS. 43-46. *Haplodrassus dixiensis* Chamberlin and Woodbury, scanning electron micrographs. 43. Embolar region of palp, ventral view, 260X. 44. Retrolateral tibial apophysis, dorsal view, 260X. 45. Epigynum, ventral view, 130X. 46. Vulva, dorsal view, 130X.

roll County, New Hampshire, in MCZ, examined).

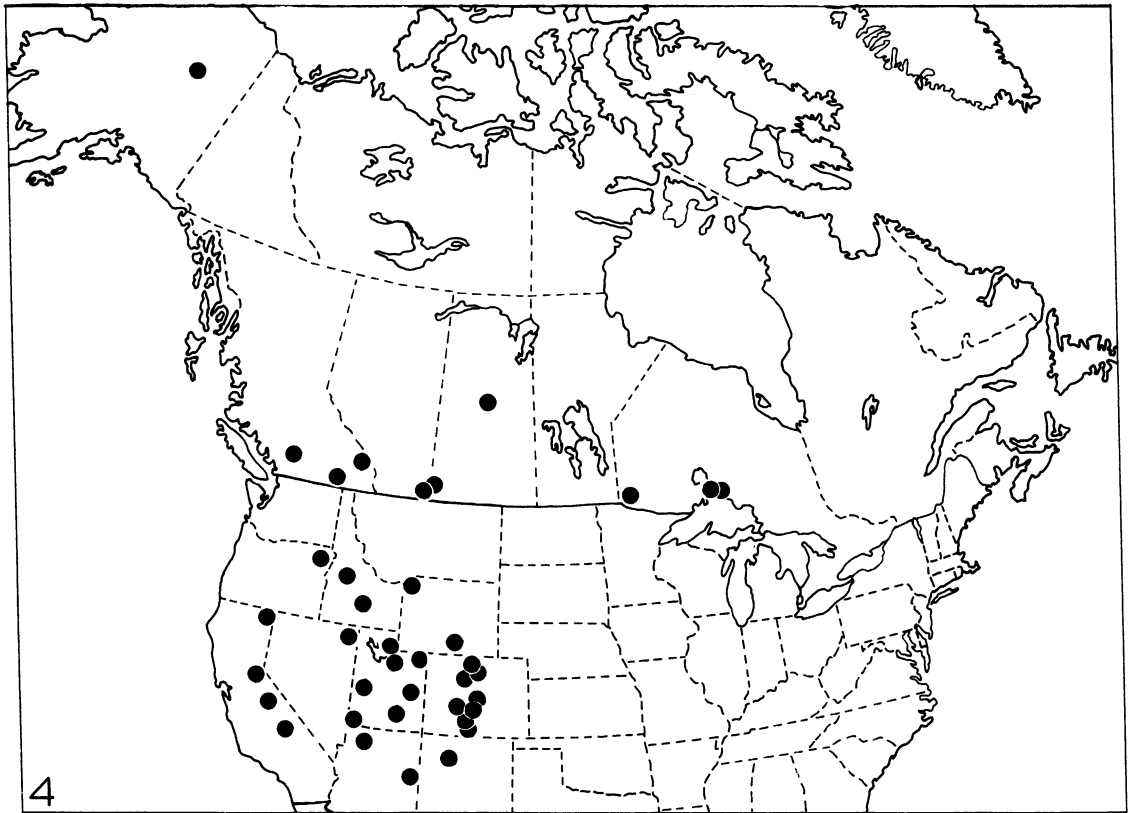
Haplodrassus bicornis: Chamberlin, 1922, p. 161. Roewer, 1954, p. 403. Bonnet, 1957, p. 2088.

Haplodrassus admes Chamberlin, 1922, p. 162 (female holotype from Arizona, no specific locality, in MCZ, examined). Roewer, 1954, p. 403. Bonnet, 1957, p. 2087. NEW SYNONYMY.

Haplodrassus uncifer Chamberlin, 1936a, p. 18, figs. 17-19 (male holotype and female allotype from Marysville Canyon, Piute County, Utah, in AMNH, examined). Roewer, 1954, p. 404. Bonnet, 1957, p. 2097. NEW SYNONYMY.

Diagnosis. *Haplodrassus bicornis* is closest to the European species *H. umbratilis* (L. Koch), from which it differs in the size and shape of the terminal apophysis and the longer free portions of the lateral arms of the epigynum (Tullgren, 1946, figs. 204-208). Both the palp (figs. 23, 27) and epigynum (figs. 25, 29) of *H. bicornis* are distinctive, and the species is unlikely to be confused with any other American form.

Male. Total length 4.11 ± 0.46 mm. Carapace 1.81 ± 0.24 mm. long, 1.42 ± 0.20 mm. wide. Femur II 1.05 ± 0.16 mm. long (88 specimens examined). Eye sizes and interdistances (mm.): AME 0.07, ALE 0.09, PME 0.12, PLE 0.09;



MAP 4. North America, showing distribution of *Haplodrassus eunis*.

AME-AME 0.08, AME-ALE 0.04, PME-PME 0.02, PME-PLE 0.09, ALE-PLE 0.04. MOQ length 0.24 mm., front width 0.23 mm., back width 0.25 mm. Terminal apophysis wide, bifid, with retrolateral prong depressed (figs. 23, 27). Retrolateral tibial apophysis greatly expanded at tip (figs. 24, 28). Leg spination typical for the genus.

Female. Total length 5.21 ± 1.22 mm. Carapace 2.03 ± 0.35 mm. long, 1.52 ± 0.31 mm. wide. Femur II 1.15 ± 0.19 mm. long (101 specimens examined). Eye sizes and interdistances (mm.): AME 0.07, ALE 0.09, PME 0.12, PLE 0.09; AME-AME 0.08, AME-ALE 0.04, PME-PME 0.03, PME-PLE 0.09, ALE-PLE 0.05. MOQ length 0.24 mm., front width 0.23 mm., back width 0.27 mm. Lateral arms of epigynum free anteriorly (figs. 25, 29). Anterior lobes of sper-

mathecae greatly reduced (figs. 26, 30). Leg spination typical for the genus.

Records. **Canada:** *Alberta:* Claresholm; Cypress Hills Provincial Park; Fort MacLeod. *British Columbia:* Vernon; Westbank. *Manitoba:* Sandilands Provincial Forest; 10 mi. E Winnipeg. *Ontario:* Chatterton, 13 mi. N Belleville. *Quebec:* King Mountain, Gatineau National Park. *Saskatchewan:* Buffalo Pound Provincial Park; 8 mi. E Saskatoon; Frenchman River, near Val Marie. **United States:** *Arizona:* Coconino Co.: N rim, Grand Canyon; Kaibab National Forest. Greenlee Co.: Buffalo Crossing, Black River, Apache National Forest; Beaver Creek. *Colorado:* Fremont Co.: Hayden Creek, Sangre de Cristo Mountains. Lake Co.: W Twin Lakes, Sawatch Mountains. Mineral Co.: Creede. Montezuma Co.: 10 mi. N Cortez; Mesa Verde National Park. Saguache Co.:

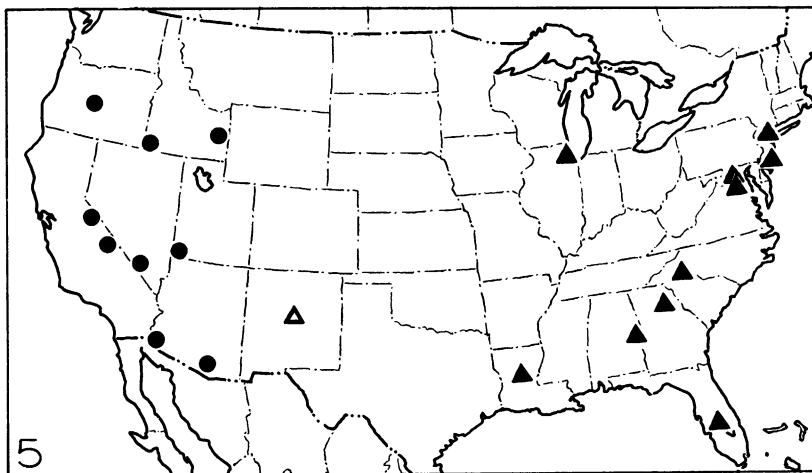
5 mi. E Cochetopa Pass. *Connecticut*: Fairfield Co.: Norwalk. Hartford Co.: Farmington. New Haven Co.: Kettletown State Park. *Illinois*: Coles Co.: Fox Ridge State Park. *Indiana*: Porter Co.: Ogden Dunes. *Maryland*: Kent Co.: Elk Neck State Forest. Prince Georges Co.: Glenn Dale. *Massachusetts*: Barnstable Co.: South Chatham. Essex Co.: Gloucester. Hampshire Co.: West Cummington. Middlesex Co.: Blue Hills Reservation; Concord; Townsend Harbor; Tyngsboro; Walden Pond. Plymouth Co.: Ellenville. *Michigan*: Calhoun Co.: Albion; Ott Biological Preserve. Clinton Co.: Bath; Rose Lake Wildlife Experiment Station. Ingham Co.: East Lansing. Jackson Co. Kalamazoo Co.: Gull Lake Biological Station. Livingston Co.: E. S. George Reserve. Marquette Co.: Sugar Loaf Mountain. Oakland Co.: Ortonville. St. Joseph Co.: Sturgis. Wexford Co.: Cadillac. *Minnesota*: Anoka Co.: Island Lake. *Montana*: Park Co.: 2 mi. SE Gardiner. *Nebraska*: Lancaster Co.: Lincoln. *New Hampshire*: Carroll Co.: Three Mile Island, Lake Winnepesaukee. Cheshire Co.: Surry. *New Jersey*: Atlantic Co.: Bass River State Forest. Burlington Co.: Lebanon State Forest. Hunterdon Co.: Lambertville. *New Mexico*: Bernalillo Co.: Cienega Canyon, Sandia Mountains. Catron Co.: Mogollon. San Miguel

Co.: Las Vegas. Taos Co.: 15 mi. NE Taos. *New York*: Suffolk Co.: Southold. Tompkins Co.: Ithaca. *Utah*: Beaver Co.: Beaver Canyon. Piute Co.: Marysvale Canyon. Salt Lake Co.: City Creek; Dry Canyon, Salt Lake City. San Juan Co.: Blanding; Horse Valley. Summit Co.: East Canyon; Smith and Morehouse Canyon. Tooele Co.: Vernon. *Virginia*: Princess Anne Co.: Virginia Beach Seashore State Park. *West Virginia*: Mercer Co.: East River Mountain, Bluefield. *Wisconsin*: Polk Co.: St. Croix Falls.

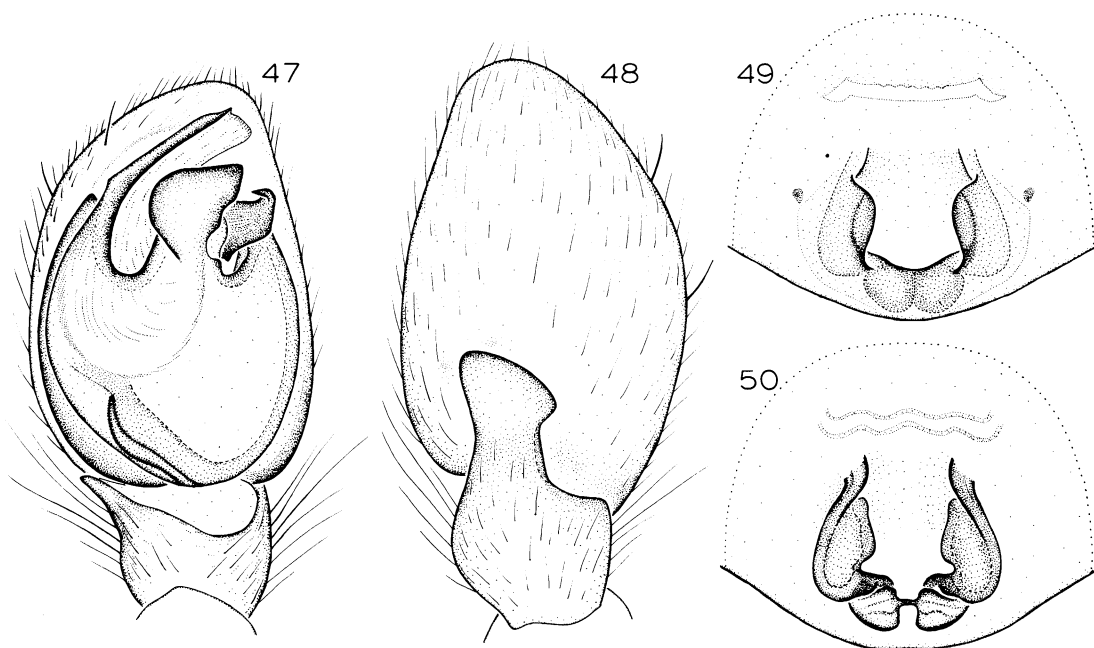
Distribution. British Columbia west to New England, south to Arizona, Nebraska, and Virginia (map 3).

Natural History. Mature males have been taken from mid-April through late July, mature females from early May through late August. Specimens have been collected at elevations between 4800 and 9500 feet, in pitfall traps in meadows, forests, and gravel pits, under stones and logs, and associated with aspens, junipers, oaks, maples, and lodgepole, ponderosa, and pitch pines.

Synonymy. Chamberlin gave no reasons for considering either *admes* or *uncifer* distinct from *bicornis*. The spacing of the lateral arms of the epigynum is slightly variable but the variation is



MAP 5. United States, showing distribution of *Haplodrassus dixiensis* (circles) and *H. mimus* (triangles); open symbol indicates a state record only.



FIGS. 47-50. *Haplodrassus mimus* Chamberlin. 47. Palp, ventral view. 48. Palp, dorsal view. 49. Epigynum, ventral view. 50. Vulva, dorsal view.

individual rather than geographic. No genitalic differences were detected among the males here assigned to *bicornis*.

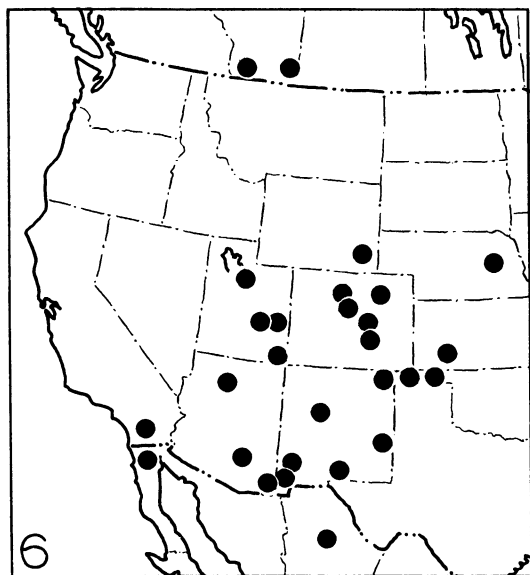
Haplodrassus eunis Chamberlin

Figures 31-38; Map 4

Haplodrassus eunis Chamberlin, 1922, p. 162 (female holotype from Arizona, no specific locality, in MCZ, examined). Roewer, 1954, p. 403. Bonnet, 1957, p. 2090.

Haplodrassus utus Chamberlin and Ivie, 1946, p. 8, figs. 9-11 (male holotype and female allotype from Provo River at North Fork, Summit County, Utah, in AMNH, examined). Roewer, 1954, p. 404. NEW SYNONYMY.

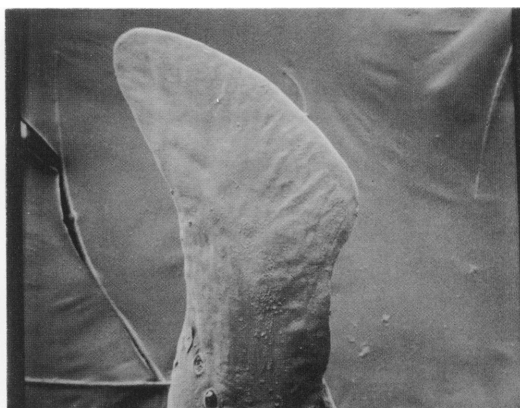
Diagnosis. *Haplodrassus eunis* is closest to the European species *H. soerenseni* (Strand), from which it differs only slightly in the shape of the terminal apophysis and the spacing of the lateral arms of the epigynum (Tullgren, 1946, figs. 209-213). The closest American form is *H. dixiensis*, from which *H. eunis* may be distinguished by the divided tip of the terminal apophysis (figs.



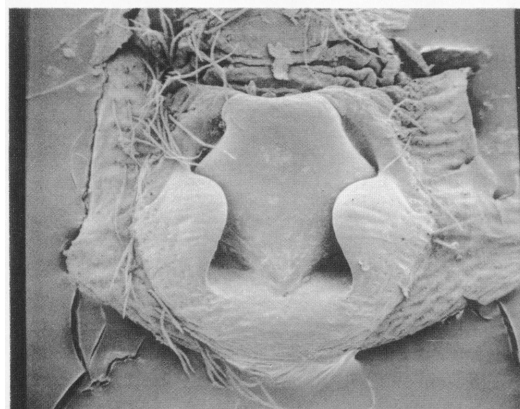
MAP 6. Western North America, showing distribution of *Haplodrassus chamberlini*.



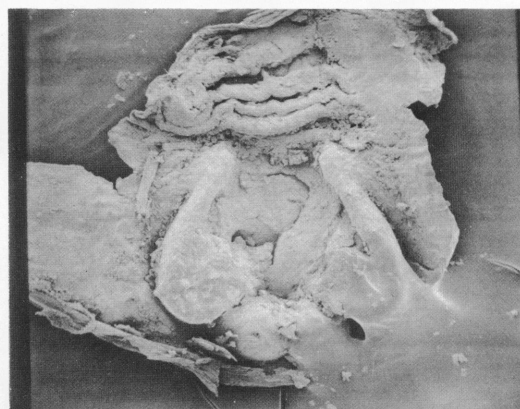
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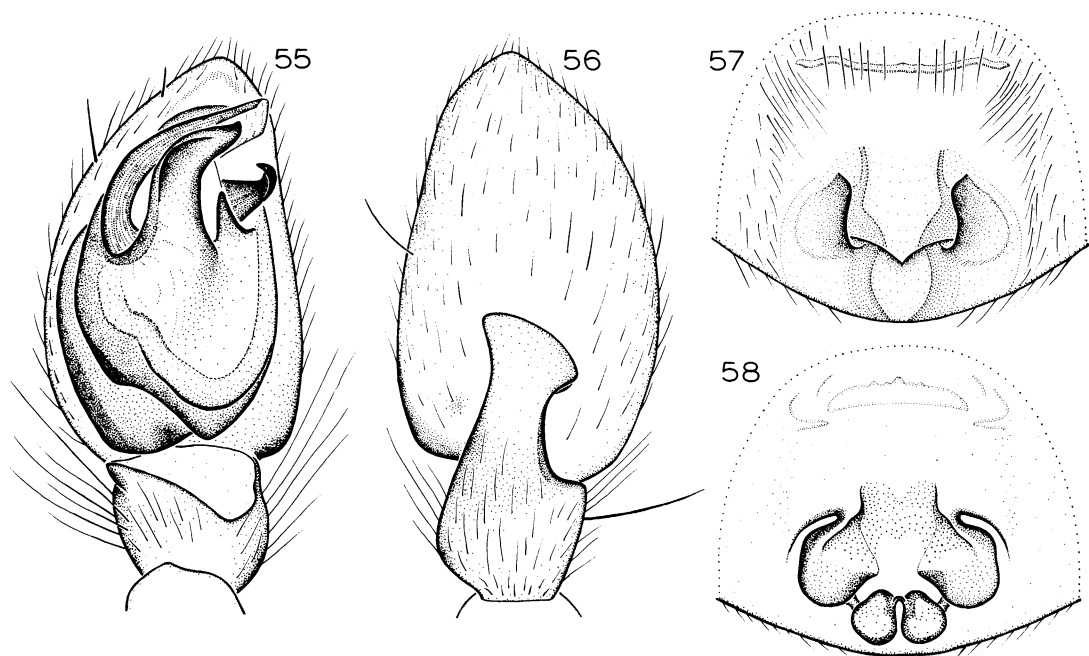
FIGS. 51-54. *Haplodrassus mimus* Chamberlin, scanning electron micrographs. 51. Embolar region of palp, ventral view, 260X. 52. Retrolateral tibial apophysis, dorsal view, 260X. 53. Epigynum, ventral view, 100X. 54. Vulva, dorsal view, 100X.

31, 35) and the anteriorly invaginated epigynal septum (figs. 33, 37).

Male. Total length 3.95 ± 0.37 mm. Carapace 1.77 ± 0.05 mm. long, 1.37 ± 0.04 mm. wide. Femur II 1.06 ± 0.05 mm. long (37 specimens examined). Eye sizes and interdistances (mm.): AME 0.05, ALE 0.07, PME 0.08, PLE 0.06; AME-AME 0.08, AME-ALE 0.03, PME-PME 0.05, PME-PLE 0.07, ALE-PLE 0.05. MOQ length 0.22 mm., front width 0.18 mm., back width 0.21 mm. Tip of terminal apophysis divided (figs. 31, 35). Retrolateral tibial apophysis rounded retrolaterally (figs. 32, 36). Leg spination: metatarsus III r0-2-2.

Female. Total length 5.42 ± 0.75 mm. Carapace 2.03 ± 0.10 mm. long, 1.55 ± 0.11 mm. wide. Femur II 1.19 ± 0.07 mm. long (54 specimens examined). Eye sizes and interdistances (mm.): AME 0.06, ALE 0.10, PME 0.12, PLE 0.10; AME-AME 0.09, AME-ALE 0.04, PME-PME 0.02, PME-PLE 0.08, ALE-PLE 0.07. MOQ length 0.28 mm., fronth width 0.21 mm., back width 0.26 mm. Epigynal septum anteriorly invaginated (figs. 33, 37). Spermathecae abruptly narrowed anteriorly (figs. 34, 38). Leg spination typical for the genus.

Records. Canada: Alberta: Cypress Hills Provincial Park. British Columbia: 20 mi. W Golden;



FIGS. 55-58. *Haplodrassus maculatus* (Banks). 55. Palp, ventral view. 56. Palp, dorsal view. 57. Epigynum, ventral view. 58. Vulva, dorsal view.

Illocet; Fountain Valley, Lillooet; Nelson. *Ontario*: 20 mi. E Kenora; Lake Peterson; 15 mi. and 75 mi. W Marathon. *Saskatchewan*: Besnard Lake; Cypress Hills; Scull Creek, 6 mi. E Piapot. **United States:** *Alaska*: Alaska Lodge, 86 mi. N Fairbanks. *Arizona*: Apache Co.: Alpine Divide Camp, 4 mi. N Alpine. Coconino Co.: 20 mi. S Jacob Lake. *California*: El Dorado Co.: Tahoe Valley. Mariposa Co.: Yosemite National Park. Modoc Co.: 15 mi. N Alturas. Tulare Co.: Johnsondale. *Colorado*: Boulder Co.: 4 mi. N Allens Park. Clear Creek Co.: Mt. Evans. Conejos Co.: Trujillo Meadows Camp. Fremont Co.: Hayden Creek, Sangre de Cristo Mountains. Gunnison Co.: One Mile Camp; Cement Creek, Sawatch Mountains; Tincup. Larimer Co.: Rocky Mountain National Park. Rio Grande Co.: Beaver Creek, San Juan Mountains. Teller Co.: Buffalo Lake. *Idaho*: Blaine Co.: Hyndman Creek, Challis National Forest. Valley Co.: McCall. *Nevada*: Elko Co.: Thomas Canyon Camp, Ruby Mountains. *New Mexico*: Bernalillo Co.: Sandia Mountains. *Oregon*: Union Co.: Anton Creek.

Utah: Daggett Co.: Deep Creek Camp, 19 mi. S Manilla. Emery Co.: Emery. Garfield Co.: Posey Lake, Aquarius Plateau. Millard Co.: Scipio. Morgan Co.: East Canyon. Summit Co.: Provo River at North Fork; Smith and Morehouse Canyon. Washington Co.: Cedar Canyon. *Wyoming*: Carbon Co.: Stratton Experimental Watershed, Saratoga. Yellowstone National Park Co.: Madsen Junction.

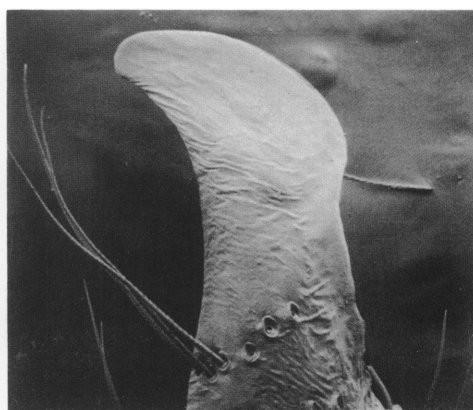
Distribution. Northern and western North America from Alaska and western Ontario south to Arizona and New Mexico (map 4).

Natural History. Mature males have been taken from late May through early July, mature females from early April through late August. Specimens have been collected at elevations between 4800 and 11,500 feet, under logs, in pit-fall traps, and associated with sphagnum, clover, grasses, sagebrush, poplars, aspens, willows, oaks, junipers, and lodgepole and sugar pines.

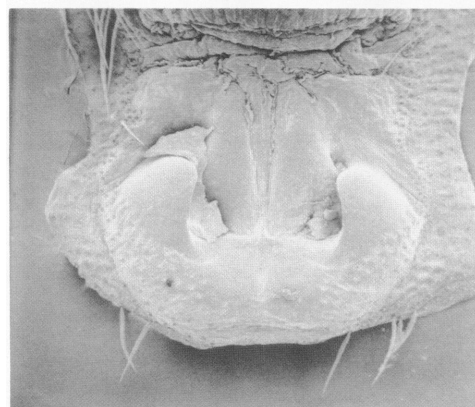
Synonymy. No genitalic differences were detected that would separate the female of *utus* from that of *eunis*.



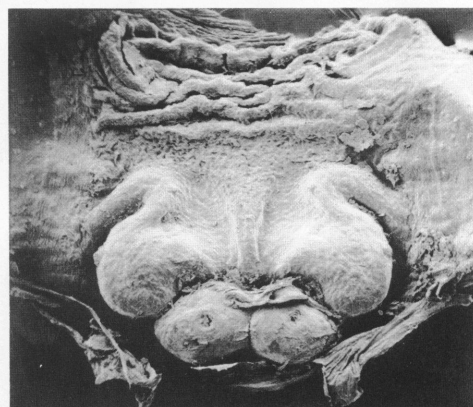
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62

FIGS. 59-62. *Haplodrassus maculatus* (Banks), scanning electron micrographs. 59. Embolar region of palp, ventral view, 260 \times . 60. Retrolateral tibial apophysis, dorsal view, 260 \times . 61. Epigynum, ventral view, 95 \times . 62. Vulva, dorsal view, 95 \times .

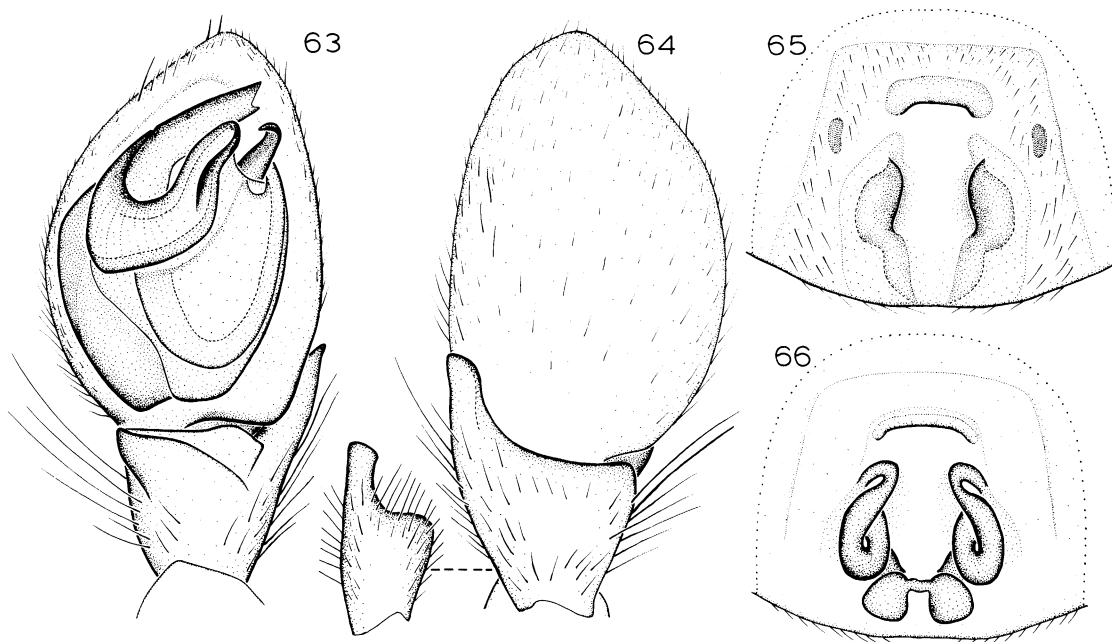
Haplodrassus dixiensis
Chamberlin and Woodbury
Figures 39-46; Map 5

Haplodrassus dixiensis Chamberlin and Woodbury, 1929, p. 134, pl. 2 (captions of pls. 1 and 2 reversed), fig. 6 (female holotype from St. George, Washington County, Utah, in AMNH, examined). Roewer, 1954, p. 403. Bonnet, 1957, p. 2090.

Diagnosis. *Haplodrassus dixiensis* is closest to *H. eunis* but may be distinguished by the undivided tip of the terminal apophysis (figs. 39, 43) and the absence of an anterior invagination of

the epigynal septum (figs. 41, 45). The genitalia also resemble those of *H. maculatus*, but the ridge on the terminal apophysis is more prolaterally situated and the lateral arms of the epigynum are closer together than in that species.

Male. Total length 4.73 \pm 0.77 mm. Carapace 1.99 \pm 0.25 mm. long, 1.53 \pm 0.23 mm. wide. Femur II 1.33 \pm 0.18 mm. long (127 specimens examined). Eye sizes and interdistances (mm.): AME 0.08, ALE 0.10, PME 0.13, PLE 0.10; AME-AME 0.11, AME-ALE 0.04, PME-PME 0.04, PME-PLE 0.12, ALE-PLE 0.09. MOQ length 0.26 mm., front width 0.27 mm., back width 0.30 mm. Ridge of terminal apophysis



FIGS. 63-66. *Haplodrassus chamberlini*, new species. 63. Palp, ventral view. 64. Palp, dorsal view, with lateral view of tibia. 65. Epigynum, ventral view. 66. Vulva, dorsal view.

situated at prolateral edge of apophysis (figs. 39, 43). Retrolateral tibial apophysis sharply pointed retrolaterally (figs. 40, 44). Leg spination: metatarsus I v1-0-0.

Female. Total length 5.76 ± 1.07 mm. Carapace 2.27 ± 0.21 mm. long, 1.72 ± 0.19 mm. wide. Femur II 1.41 ± 0.14 mm. long (45 specimens examined). Eye sizes and interdistances (mm.): AME 0.07, ALE 0.10, PME 0.12, PLE 0.09; AME-AME 0.09, AME-ALE 0.04, PME-PME 0.05, PME-PLE 0.10, ALE-PLE 0.08. MOQ length 0.28 mm., front width 0.23 mm., back width 0.29 mm. Lateral arms of epigynum closely spaced, epigynal septum without anterior invagination (figs. 41, 45). Spermathecae gradually narrowed anteriorly (figs. 42, 46). Leg spination: metatarsi: I v1-0-0; IV p0-1-2.

Records. **United States:** **Arizona:** Pima Co.: Santa Rita Mountains. Yuma Co.: Yuma. **California:** Inyo Co.: Roger's Peak, Death Valley. Mono Co.: Benton; 4 mi. S Coleville; Convict Creek; Hammil Station; Montgomery Canyon. **Idaho:** Bonneville Co.: Idaho Falls. Owyhee Co.: 7 mi. NE Bruneau. **Nevada:** Nye Co.: Mercury.

Oregon: Deschutes Co.: Redmond. **Utah:** Washington Co.: Hurricane; Pintura; St. George.

Distribution. Western United States from Oregon and Idaho south to Arizona (map 5).

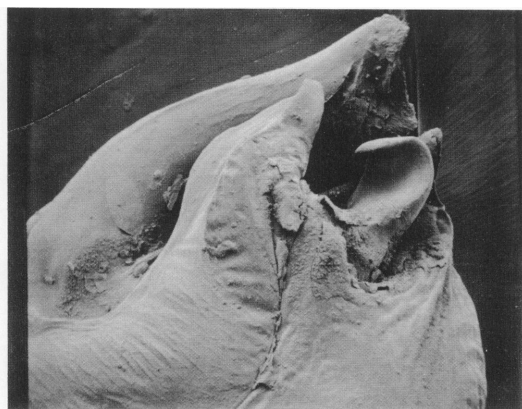
Natural History. Mature males have been taken from early November through early May, mature females year round but most commonly in March, April, and May. Specimens have been collected at elevations of 2600 feet in sagebrush and chaparral associations.

Haplodrassus mimus Chamberlin

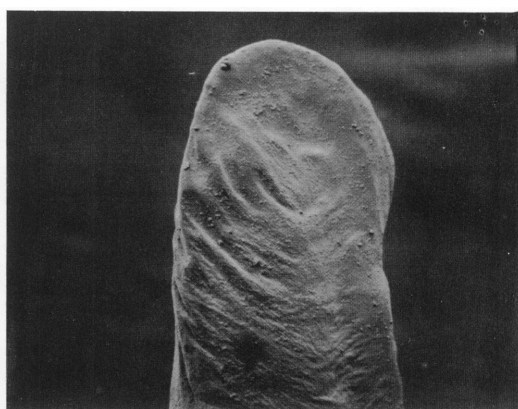
Figures 47-54; Map 5

Haplodrassus mimus Chamberlin, 1922, p. 161 (female holotype from Great Falls, Fairfax County, Virginia, in MCZ, examined). Roewer, 1954, p. 403. Bonnet, 1957, p. 2091.

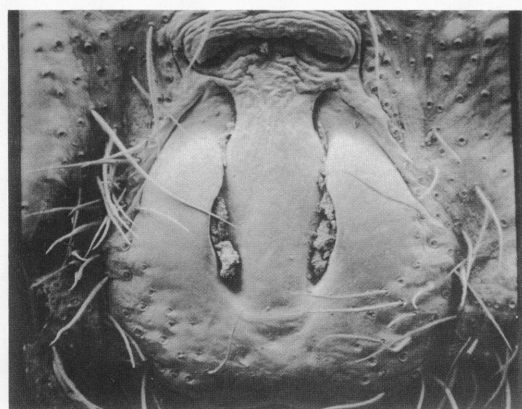
Diagnosis. *Haplodrassus mimus* is closest to *H. maculatus* but may be distinguished from it and the other known species by the ridge on the terminal apophysis protruding far beyond the apophysis itself (figs. 47, 51) and the wide, distinct epigynal septum (figs. 49, 53).



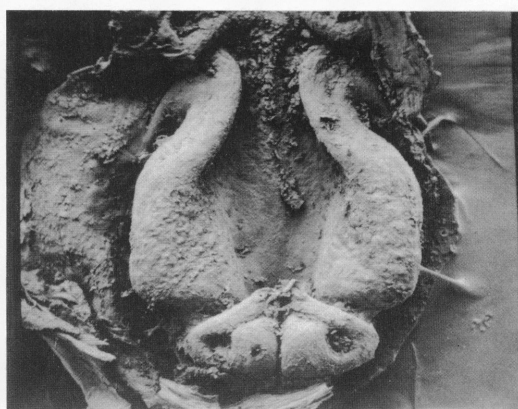
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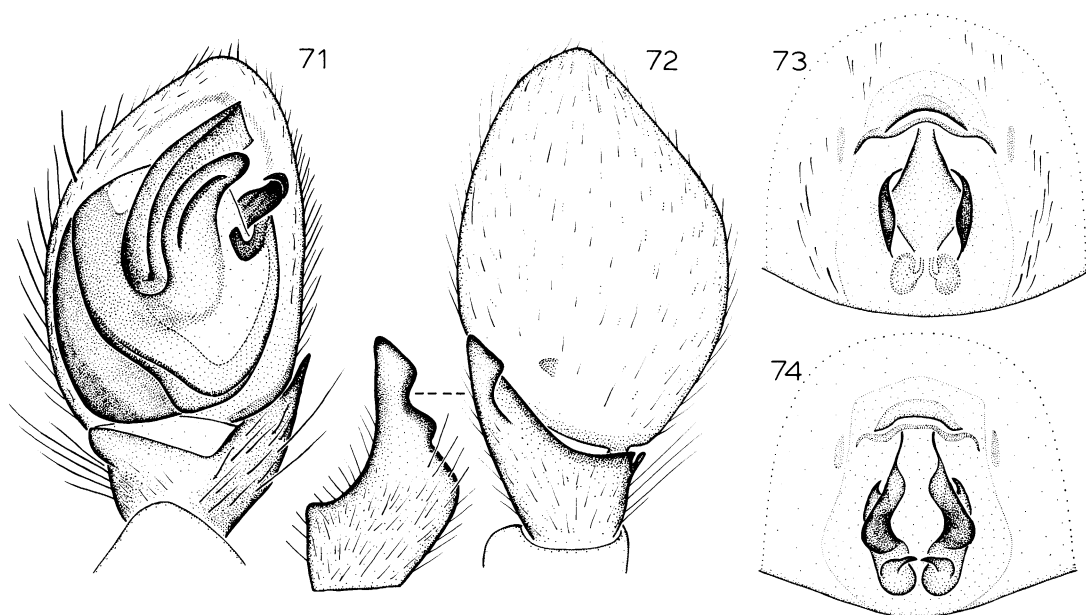
FIGS. 67-70. *Haplodrassus chamberlini*, new species, scanning electron micrographs. 67. Embolar region of palp, ventral view, 260X. 68. Retrolateral tibial apophysis, lateral view, 660X. 69. Epigynum, ventral view, 130X. 70. Vulva, dorsal view, 130X.

Male. Total length 3.71-4.46 mm. Carapace 1.80-2.23 mm. long, 1.38-1.63 mm. wide. Femur II 1.04-1.26 mm. long (four specimens). Eye sizes and interdistances (mm.): AME 0.08, ALE 0.10, PME 0.13, PLE 0.09; AME-AME 0.12, AME-ALE 0.05, PME-PME 0.04, PME-PLE 0.11, ALE-PLE 0.08. MOQ length 0.32 mm., front width 0.27 mm., back width 0.30 mm. Ridge of terminal apophysis protruding far beyond apophysis (figs. 47, 51). Retrolateral tibial apophysis expanded at tip (figs. 48, 52). Leg spination: tibia III v2-0-2.

Female. Total length 4.91±0.47 mm. Carapace 1.87±0.07 mm. long, 1.39±0.07 mm. wide. Fe-

mur II 1.08±0.09 mm. long (11 specimens examined). Eye sizes and interdistances (mm.): AME 0.07, ALE 0.10, PME 0.11, PLE 0.09; AME-AME 0.09, AME-ALE 0.03, PME-PME 0.05, PME-PLE 0.08, ALE-PLE 0.05. MOQ length 0.25 mm., front width 0.23 mm., back width 0.27 mm. Lateral arms of epigynum widely separated, epigynal septum distinct (figs. 49, 53). Spermathecae gradually widened posteriorly (figs. 50, 54). Leg spination: tibia III v2-1-2.

Records. United States: *Alabama*: Lee Co.: 6.3 mi. E Salem. *Florida*: Highlands Co.: Archbold Biological Station, Lake Placid. *Georgia*: Jackson Co.: SE Pendergrass. *Illinois*: Cook Co.:



FIGS. 71-74. *Haplodrassus taibo* (Chamberlin). 71. Palp, ventral view. 72. Palp, dorsal view, with lateral view of tibia. 73. Epigynum, ventral view. 74. Vulva, dorsal view.

Chicago. *Louisiana*: Grant Par.: Dry Prong. *Maryland*: Montgomery Co.: Plummers Island. *New Jersey*: Bergen Co.: Ramsey. Ocean Co.: Lakehurst. *New Mexico*: no specific locality. *North Carolina*: Polk Co.: Tryon. *Virginia*: Fairfax Co.: Great Falls.

Distribution. United States from New Mexico east to New Jersey and Florida (map 5). It is possible that the New Mexico record is the result of mislabeling, in which case the distribution of the species would agree with that of a large number of spider species associated with the eastern deciduous forests.

Natural History. Mature males have been taken from late November through late April, mature females from November through early May. Specimens have been collected under rocks. This species is apparently mature only in winter and early spring, when little collecting is done; this probably accounts for the rarity of specimens in collections.

Haplodrassus maculatus (Banks)

Figures 55-62; Map 3

Zelotes maculata Banks, 1904, p. 336, fig. 38

(male holotype from Claremont, Los Angeles County, California, in MCZ, examined).

Haplodrassus maculatus: Chamberlin, 1922, p. 162. Roewer, 1954, p. 403. Bonnet, 1957, p. 2090.

Diagnosis. *Haplodrassus maculatus* is closest to *H. mimus* but may be distinguished by the smaller ridge on the terminal apophysis (figs. 55, 59) and the more widely separated lateral arms of the epigynum (figs. 57, 61). All specimens of *H. maculatus* have a conspicuous pattern of alternating dark and light chevrons on the dorsum of the abdomen, but as some specimens of *H. taibo*, *chamberlini*, and *signifer* have similar patterns coloration cannot be used to separate the species.

Male. Total length 3.92 ± 0.29 mm. Carapace 1.74 ± 0.13 mm. long, 1.33 ± 0.09 mm. wide. Femur II 1.14 ± 0.10 mm. long (26 specimens examined). Eye sizes and interdistances (mm.): AME 0.06, ALE 0.08, PME 0.08, PLE 0.08; AME-AME 0.08, AME-ALE 0.03, PME-PME 0.05, PME-PLE 0.09, ALE-PLE 0.07. MOQ length 0.23 mm., front width 0.20 mm., back width 0.21 mm. Ridge of terminal apophysis situated near prolateral edge of apophysis, not

protruding beyond apophysis (figs. 55, 59). Retrolateral tibial apophysis symmetrically expanded at tip (figs. 56, 60). Leg spination typical for the genus.

Female. Total length 5.31 ± 0.85 mm. Carapace 2.07 ± 0.18 mm. long, 1.56 ± 0.16 mm. wide. Femur II 1.29 ± 0.14 mm. long (10 specimens). Eye sizes and interdistances (mm.): AME 0.06, ALE 0.08, PME 0.12, PLE 0.07; AME-AME 0.09, AME-ALE 0.03, PME-PME 0.03, PME-PLE 0.08, ALE-PLE 0.08. MOQ length 0.24 mm., front width 0.21 mm., back width 0.26 mm. Lateral arms of epigynum widely separated, epigynal septum indistinct (figs. 57, 61). Spermathecae abruptly widened posteriorly (figs. 58, 62). Leg spination: metatarsus IV v2-0-2.

Records. United States: California: Los Angeles Co.: 13 mi. N Castaic; Claremont; Big Tujunga Canyon, San Gabriel Mountains. Riverside Co.: Winchester. San Bernardino Co.: Alta Loma; N Yucaipa. San Diego Co.: Jacumba. **Mexico: Baja California Norte:** 17 mi. N Colonia Guerrero; 12 mi. N El Rosario.

Distribution. Southern California and Baja California Norte (map 3).

Natural History. Mature males have been taken from late February through mid-May, mature females from early January through mid-May. Specimens have been collected in pitfall traps in chaparral associations.

Haplodrassus chamberlini, new species

Figures 63-70; Map 6

Types. Male holotype from Felt, Cimarron County, Oklahoma (April 27, 1962; W. Ivie) and female paratype from Guymon, Texas County, Oklahoma (same data), deposited in AMNH.

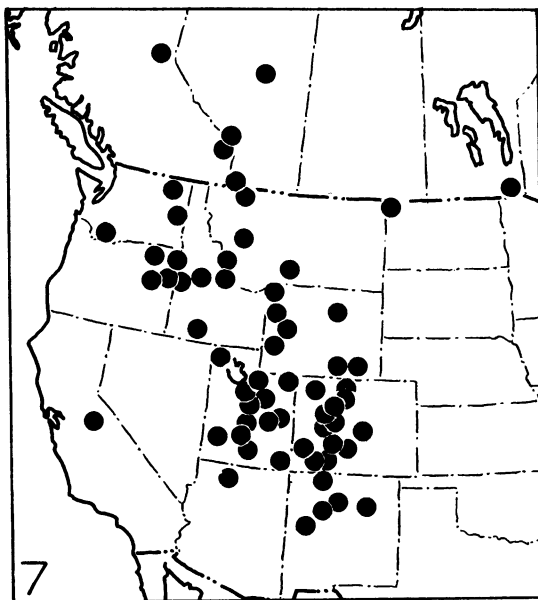
Etymology. The specific name is a patronym in honor of the late Dr. R. V. Chamberlin, in recognition of his pioneering work on *Haplodrassus* and *Orodorassus*.

Diagnosis. *Haplodrassus chamberlini* and *H. taibo* differ from the other American species in that the retrolateral tibial apophysis is not shifted dorsally (figs. 64, 72) and the epigynal septum is long and narrow (figs. 65, 73). Specimens belonging to *H. chamberlini* may be distinguished by the unexpanded base of the retrolateral tibial apophysis (figs. 64, 68) and by the

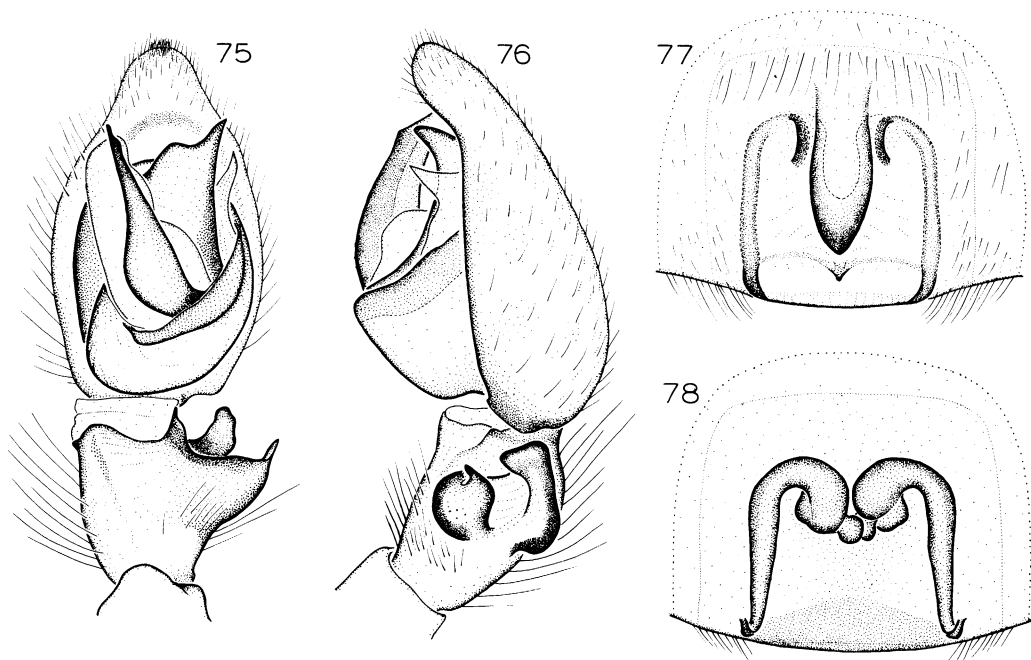
absence of an anterior epigynal ridge (figs. 65, 69).

Male. Total length 4.77 ± 0.80 mm. Carapace 2.30 ± 0.40 mm. long, 1.76 ± 0.27 mm. wide. Femur II 1.49 ± 0.20 mm. long (55 specimens examined). Eye sizes and interdistances (mm.): AME 0.07, ALE 0.10, PME 0.13, PLE 0.09; AME-AME 0.09, AME-ALE 0.03, PME-PME 0.03, PME-PLE 0.08, ALE-PLE 0.07. MOQ length 0.28 mm., front width 0.23 mm., back width 0.29 mm. Ridge of terminal apophysis situated near retrolateral edge of apophysis (figs. 63, 67). Retrolateral tibial apophysis actually on side, uniform in width throughout (figs. 64, 68). Leg spination: tibia III v2-1-2; metatarsus I v0-0-0.

Female. Total length 7.17 ± 1.42 mm. Carapace 2.92 ± 0.42 mm. long, 2.25 ± 0.35 mm. wide. Femur II 1.75 ± 0.25 mm. long (44 specimens examined). Eye sizes and interdistances (mm.): AME 0.09, ALE 0.11, PME 0.13, PLE 0.11; AME-AME 0.10, AME-ALE 0.03, PME-PME 0.02, PME-PLE 0.12, ALE-PLE 0.08. MOQ length 0.32 mm., front width 0.28 mm., back width 0.28 mm. Epigynal septum narrow, not headed by anterior epigynal ridge (figs. 65, 69).



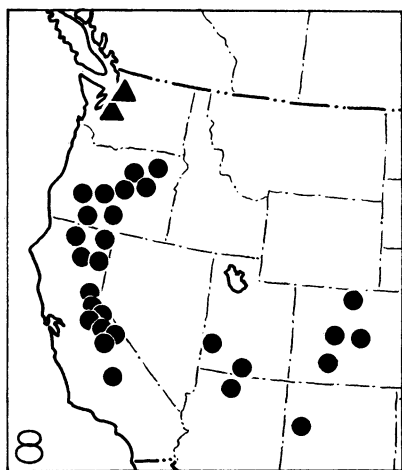
MAP 7. Western North America, showing distribution of *Orodorassus coloradensis*.



FIGS. 75-78. *Orodassus coloradensis* (Emerton). 75. Palp, ventral view. 76. Palp, retrolateral view. 77. Epigynum, ventral view. 78. Vulva, dorsal view.

Spermathecae coiled in figure-8 pattern (figs. 66, 70). Leg spination as in male.

Records. Canada: *Alberta*: 10 mi. W Leth-

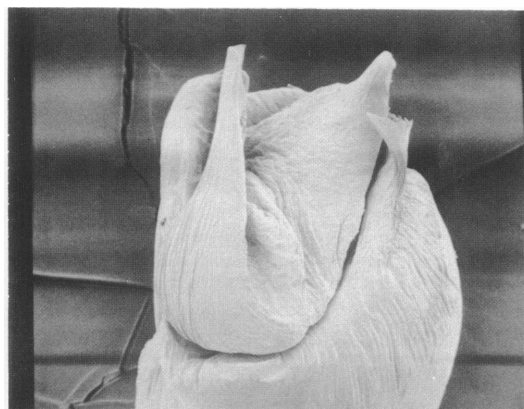


MAP 8. Western United States, showing distribution of *Orodassus assimilis* (circles) and *O. orites* (triangles).

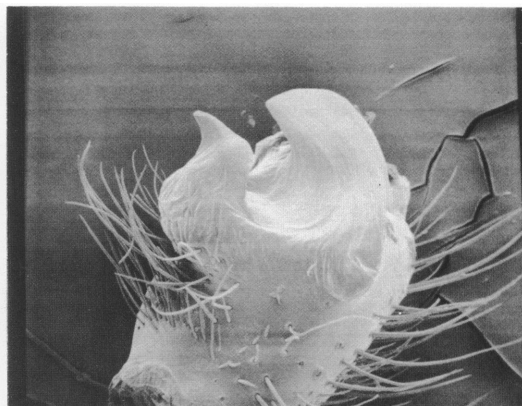
bridge; 8 mi. E Medicine Hat. **United States:** *Arizona*: Cochise Co.: 27 mi. NE Douglas. Coconino Co. Pinal Co.: Superior. *California*: Riverside Co.: Fulmor Lake, San Jacinto Mountains. *Colorado*: Boulder Co.: Boulder. Denver Co.: Englewood. El Paso Co.: Peyton Road. Morgan Co.: 6 mi. N Fort Morgan. Pueblo Co.: Boone. *Kansas*: Gray Co. *Nebraska*: Platte Co.: Columbus. *New Mexico*: Bernalillo Co.: Bosque del Rio Grande, Albuquerque. Grant Co.: Burro Mountains; Hurler; Silver City; Straight Canyon. Hidalgo Co.: Lordsburg. Otero Co.: High Rolls Mountain. Roosevelt Co.: Milnesand. Union Co.: Clayton. *Oklahoma*: Cimarron Co.: Felt. Texas Co.: Geymon. *Utah*: Emery Co.: Ferron. Grand Co.: Moab. Salt Lake Co.: Salt Lake City. San Juan Co.: Bluff. *Wyoming*: Laramie Co.: Cheyenne. Platte Co.: Glendo. *Mexico*: *Baja California Norte*: Laguna Hanson; Sierra Juárez, 4 mi. N Rancho El Topo. *Chihuahua*: Primavera.

Distribution. Western North America from Alberta south to Baja California Norte and Chihuahua (map 6).

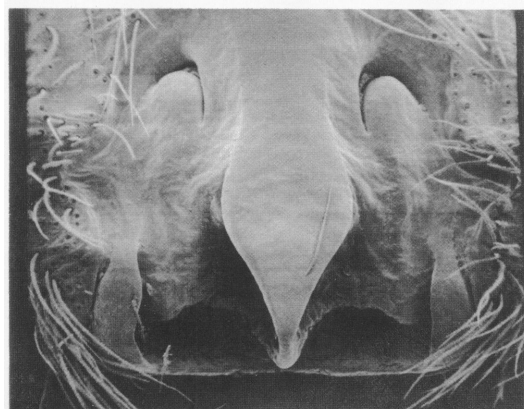
Natural History. Mature males have been



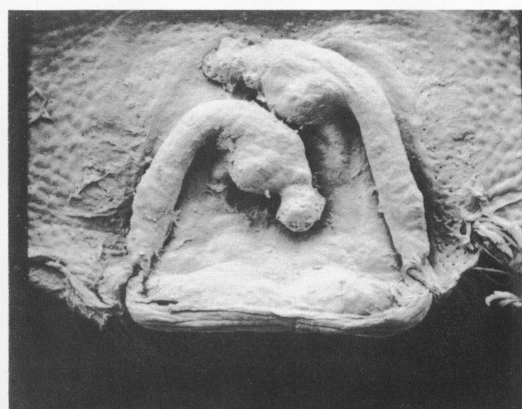
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FIGS. 79-82. *Orodassus coloradensis* (Emerton), scanning electron micrographs. 79. Embolar region of palp, ventral view, 100 \times . 80. Retrolateral tibial apophysis, lateral view, 100 \times . 81. Epigynum, ventral view, 100 \times . 82. Vulva, dorsal view, 70 \times .

taken from late January through early July, mature females from late March through early September. Specimens have been collected at elevations between 4500 and 7000 feet in pitfall traps in grass, under trash and dung, in buildings, and associated with yucca, ephedra, allthorn, mesquite, pinyon pine, juniper, and nolina.

Haplodrassus taibo (Chamberlin)

Figures 71-74; Map 1

Zelotes taibo Chamberlin, 1920, p. 6, pl. 2, fig. 5 (female holotype from Claremont, Los Angeles County, California, in MCZ, examined).

Haplodrassus taibo: Chamberlin, 1922, p. 161. Roewer, 1954, p. 403. Bonnet, 1957, p. 2096.

Diagnosis. *Haplodrassus taibo* is closest to *H. chamberlini* but may be distinguished from it and the other known species by the basally expanded retrolateral tibial apophysis (fig. 72) and the narrow epigynal septum headed by an anterior epigynal ridge (fig. 73).

Male. Total length 3.64 mm. Carapace 1.82 mm. long, 1.37 mm. wide. Femur II 1.12 mm. long (one specimen, AMNH). Eye sizes and interdistances (mm.): AME 0.06, ALE 0.09, PME 0.09, PLE 0.08; AME-AME 0.07, AME-ALE

0.02, PME-PME 0.05, PME-PLE 0.07, ALE-PLE 0.05. MOQ length 0.22 mm., front width 0.19 mm., back width 0.22 mm. Embolus and terminal apophysis originating from middle of tegulum (fig. 71). Retrolateral tibial apophysis actually on side, basally expanded (fig. 72). Leg spination: tibiae: I v2-2-2; II v1-2-2; metatarsus III r0-2-2.

Female. Total length 6.08 mm. Carapace 2.16 mm. long, 2.02 mm. wide. Femur II 1.40 mm. long (holotype). Eye sizes and interdistances (mm.): AME 0.07, ALE 0.11, PME 0.10, PLE 0.09; AME-AME 0.09, AME-ALE 0.03, PME-PME 0.05, PME-PLE 0.12, ALE-PLE 0.08. MOQ length 0.25 mm., front width 0.23 mm., back width 0.25 mm. Epigynal septum narrow, headed by anterior epigynal ridge (fig. 73). Spermathecae elongate, with basal protuberances (fig. 74). Leg spination (tibiae and metatarsi IV missing): tibia II v0-1-0; metatarsus III r0-2-2.

Records. United States: California: Los Angeles Co.: Claremont. Riverside Co.: Fulmor Lake, San Jacinto Mountains.

Distribution. Southern California (map 1).

Natural History. The single male was taken on June 1 in a yellow pine association at an elevation of 7000 feet.

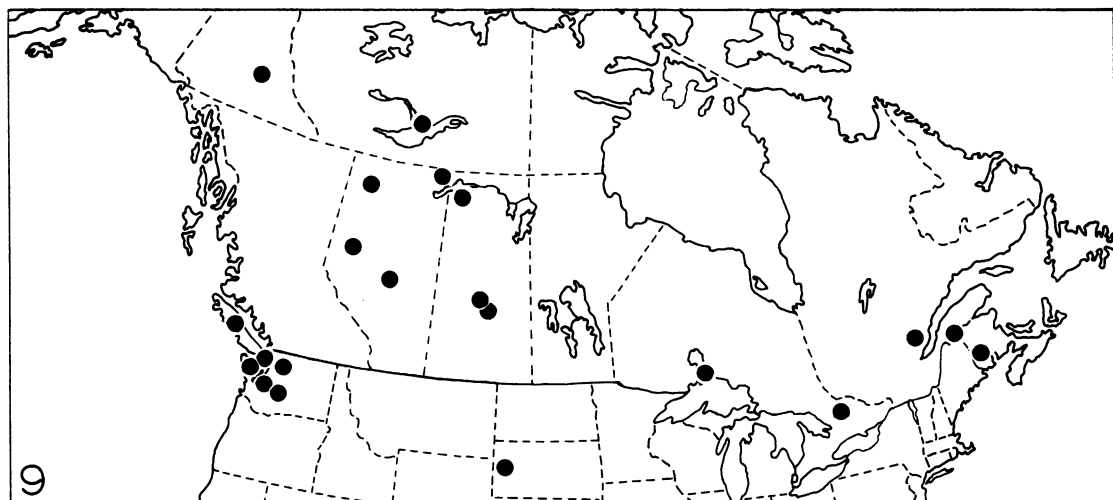
ORODRASSUS CHAMBERLIN

Orodassus Chamberlin, 1922, p. 163 (type species by original designation *Drassus coloraden-*

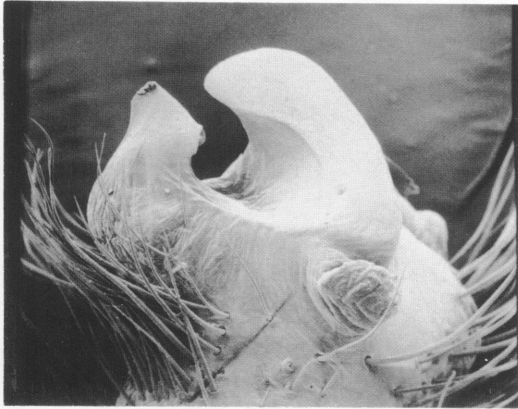
sis Emerton). Roewer, 1954, p. 406. Bonnet, 1958, p. 3209.

Diagnosis. Characters shared by *Orodassus* and *Haplodrassus* have been listed above; specimens belonging to *Orodassus* can be distinguished by the posterior median eyes being separated by more than their diameter, by the presence of a median epigynal projection in females (figs. 77, 89, 97, 105), and by the retrolateral tibial apophysis of males being either bifid, with dorsal and ventral prongs (figs. 76, 88, 96) or laterally expanded (figs. 103, 104).

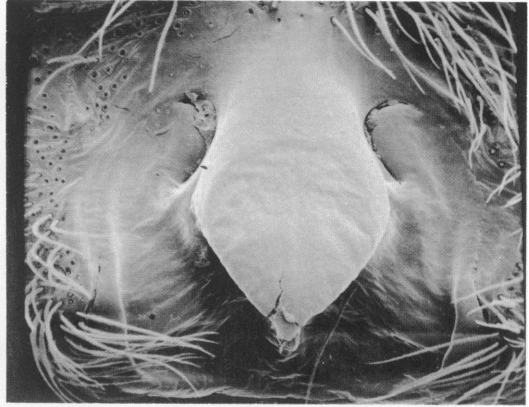
Description. As for *Haplodrassus*, except for the following. Total length 6-12 mm. Anterior lateral eyes oval, posterior medians irregularly triangular. Anterior median eyes separated by their radius from anterior laterals. Posterior median eyes separated by more than their diameter, by one and one-half times their diameter from posterior laterals. Chelicerae with three or four promarginal teeth. Sternum with sclerotized extensions to coxae. Typical leg spination pattern (only surfaces bearing spines listed): femora: I d1-1-0, p0-0-1; II d1-1-0, p0-1-1; III d1-1-0, p0-1-1, r0-1-1; IV d1-1-0, r0-0-1; tibiae: I, II v0-1-0; III p1-0-1, v1-1-2, r1-0-1; IV p1-0-1, v1-2-2, r1-0-1; metatarsi: I, II v2-0-0; III p2-0-2, v2-0-2, r1-0-2; IV p2-0-2, v2-0-2, r2-0-2. Metatarsi with light, tarsi with dense scopulae. Anterior spinnerets separated by only two-thirds of their basal



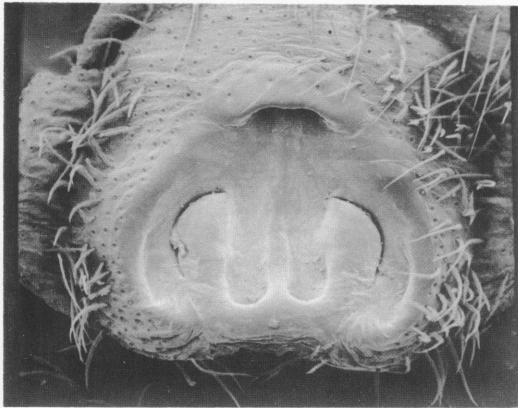
MAP 9. Northern North America, showing distribution of *Orodassus canadensis*.



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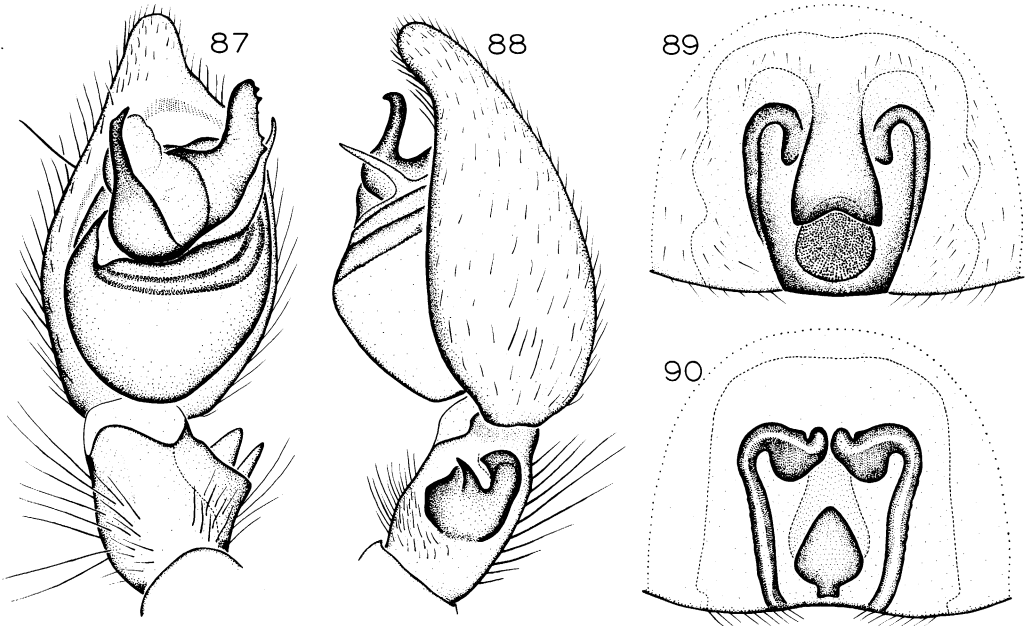
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FIGS. 83-86. Scanning electron micrographs. 83, 84. *Orodassus coloradensis* (Emerton). 83. Retro-lateral tibial apophysis, lateral view, variant from Skamania County, Washington, 70X. 84. Epigynum, ventral view, variant from Bernalillo County, New Mexico, 100X. 85, 86. *O. orites* Chamberlin and Gertsch. 85. Epigynum, ventral view, 100X. 86. Vulva, dorsal view, 100X.

width. Palp with thick prolateral or dorsoapical embolus, medially or retrolaterally situated terminal apophysis, and usually with spikelike median apophysis. Retrolateral tibial apophysis either bifid, with dorsal and ventral prongs, or laterally expanded. Epigynum with median projection, usually elevated over an atrium. Spermathecae and ducts distinct from cuticle.

Uncertain Name. Chamberlin (1922) was unable to find the types of *Drassus vastus* Banks (1896) in the Banks collection at the Museum of Comparative Zoology, but nonetheless transferred the species to *Orodassus*. This decision

was presumably made on the basis of Banks's verbal description of the female epigynum, which roughly matches that of the species described below as *O. canadensis*. Evidently Bryant subsequently discovered the types, as the MCZ type collection currently includes a vial containing a label bearing both the species name and the correct locality data (Olympia, Washington) in Banks's handwriting and a second label in Bryant's handwriting repeating the data and marking the specimens as types. None of the five spiders in the vial is an *Orodassus*, however; four are penultimate female *Gnaphosa* and the fifth is



FIGS. 87-90. *Orodassus assimilis* (Banks). 87. Palp, ventral view. 88. Palp, retrolateral view. 89. Epigynum, ventral view. 90. Vulva, dorsal view.

a juvenile *Drassodes*. As Banks's epigynal description could have been based on the rudimentary epigynum of one of the penultimate *Gnaphosa*, and as there are no other specimens in the MCZ collection with even remotely similar data, there is no reason to suspect that Bryant erred in recognizing these specimens as Banks's original material. Thus, *Drassus vastus* Banks must be considered a *nomen dubium*, as none of the juveniles can be identified to species, and a new name, *O. canadensis*, is introduced below for the species previously identified in collections as *O. vastus* (Banks). This solution seems best as even if the five specimens are regarded as spurious types, Banks's description could be construed as referring to either *O. canadensis* or *O. assimilis*.

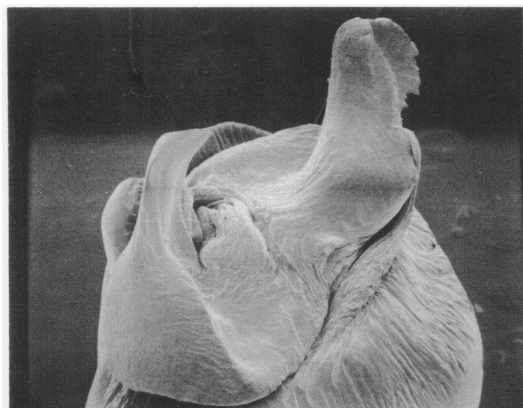
KEY TO SPECIES OF *ORODASSUS*

1. Tibiae I and II with two pairs of ventral spines; retrolateral tibial apophysis without a ventral prong (figs. 103, 104); median epigynal projection not elevated over an atrium (figs. 85, 105). *orites*
2. Tip of terminal apophysis narrow, sharply pointed (figs. 75, 79); median epigynal projection arrow-shaped (figs. 77, 81, 84). *coloradensis*
3. Tip of terminal apophysis broadly rounded (as in figs. 87, 95); median epigynal projection not arrow-shaped (as in figs. 89, 97). *assimilis*
3. Tip of terminal apophysis irregularly serrated (figs. 87, 91); median epigynal projection relatively short, reaching only to midpoint of epigynum (figs. 89, 93). *assimilis*
- Tip of terminal apophysis not serrated, recurved (figs. 95, 99); median epigynal projection relatively long, almost reaching posterior margin of epigynum (figs. 97, 101). *canadensis*

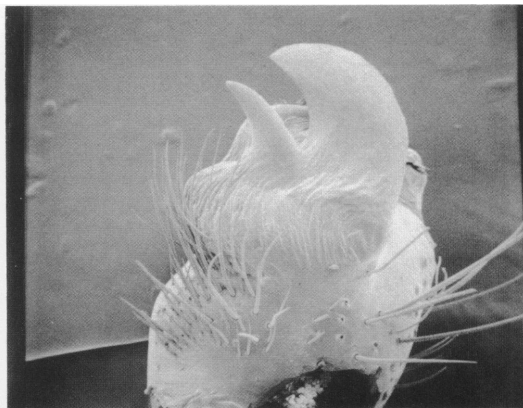
Orodassus coloradensis (Emerton)

Figures 75-84; Map 7

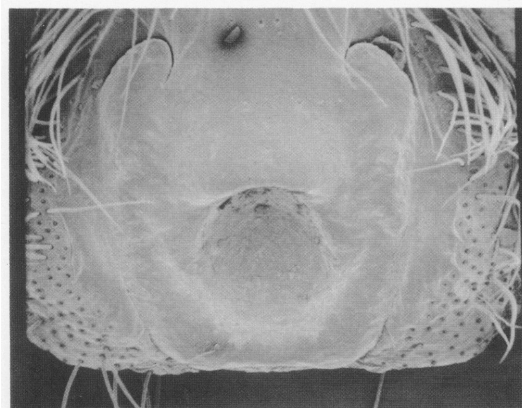
Drassus coloradensis Emerton, 1877, p. 528, fig.



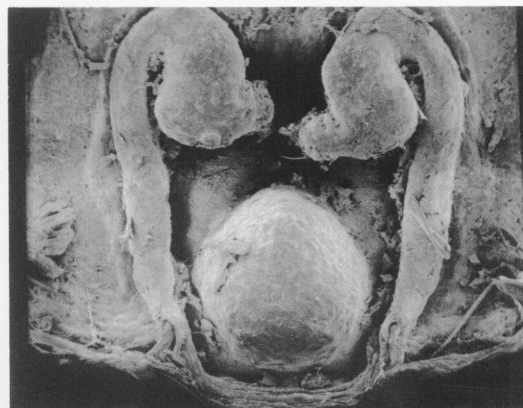
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94

FIGS. 91-94. *Orodassus assimilis* (Banks), scanning electron micrographs. 91. Embolar region of palp, ventral view, 100X. 92. Retrolateral tibial apophysis, lateral view, 100X. 93. Epigynum, ventral view, 95X. 94. Vulva, dorsal view, 95X.

19 (male holotype from Gray's Peak, Colorado, depository unknown; presumed destroyed).

Teminius continentalis Keyserling, 1887, p. 423, fig. 2 (two female syntypes from Bridger Basin, Utah, in MCZ, examined; first synonymized by Chamberlin, 1922).

Syrisca continentalis: Simon, 1897, p. 129.

Drassodes melius Chamberlin, 1919, p. 246, pl. 16, figs. 4, 5 (female syntype from Uinta Mountains, Utah, in MCZ, examined; first synonymized with *coloradensis* by Chamberlin, 1922).

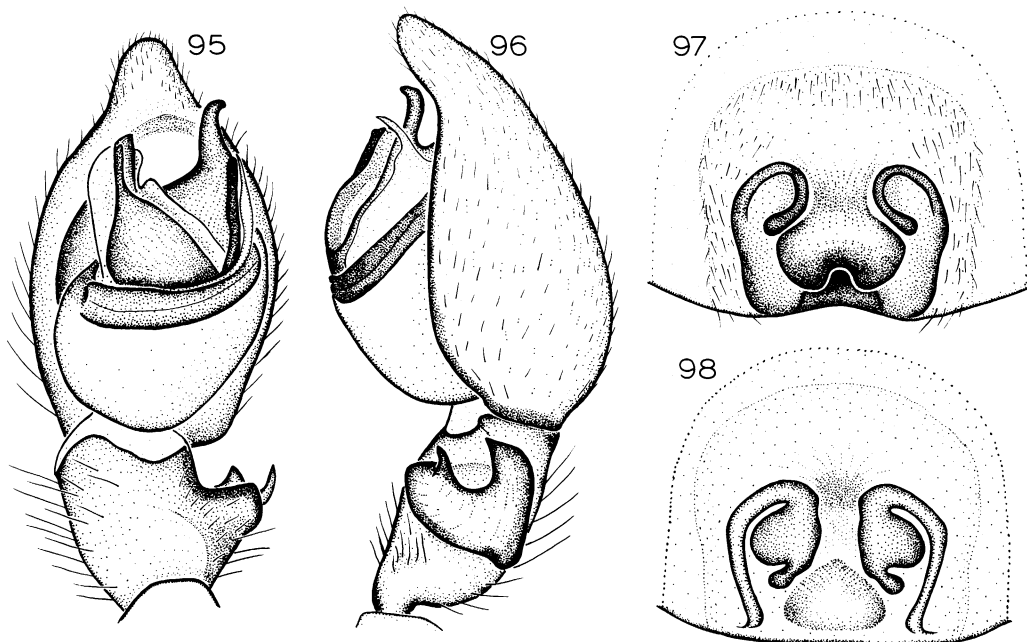
Drassodes coloradensis: Emerton, 1920, p. 350.

Orodassus coloradensis: Chamberlin, 1922, p.

163. Roewer, 1954, p. 406. Bonnet, 1958, p. 3209.

Diagnosis. *Orodassus coloradensis* is a distinctive species easily recognizable by the narrow terminal apophysis (figs. 75, 79) and the sharply pointed median epigynal projection (figs. 77, 81, 84).

Male. Total length 8.03 ± 0.53 mm. Carapace 3.50 ± 0.26 mm. long, 2.72 ± 0.20 mm. wide. Femur II 2.73 ± 0.22 mm. long (94 specimens examined). Eye sizes and interdistances (mm.): AME 0.13, ALE 0.15, PME 0.14, PLE 0.16; AME-AME 0.17, AME-ALE 0.05, PME-PME



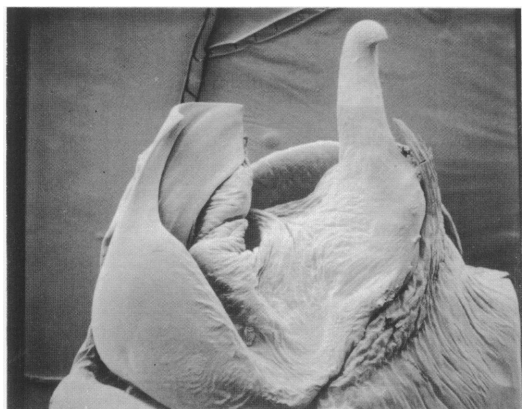
FIGS. 95-98. *Orodorassus canadensis*, new species. 95. Palp, ventral view. 96. Palp, retrolateral view. 97. Epigynum, ventral view. 98. Vulva, dorsal view.

0.15, PME-PLE 0.22, ALE-PLE 0.11. MOQ length 0.44 mm., front width 0.43 mm., back width 0.42 mm. Tip of terminal apophysis narrowed, sharply pointed (figs. 75, 79). Retrolateral tibial apophysis with sinuous ventral prong (figs. 76, 80), sometimes with small projection below dorsal prong (fig. 83). Leg spination: femur III r0-0-1.

Female. Total length 8.96 ± 0.89 mm. Carapace 3.89 ± 0.25 mm. long, 3.10 ± 0.23 mm. wide. Femur II 2.83 ± 0.22 mm. long (333 specimens examined). Eye sizes and interdistances (mm.): AME 0.17, ALE 0.18, PME 0.16, PLE 0.17; AME-AME 0.18, AME-ALE 0.09, PME-PME 0.23, PME-PLE 0.28, ALE-PLE 0.19. MOQ length 0.54 mm., front width 0.52 mm., back width 0.55 mm. Epigynum with sharply pointed, arrow-shaped median projection (figs. 77, 81), sometimes greatly widened (fig. 84). Spermathecal ducts asymmetrical (figs. 78, 82). Leg spination typical for the genus.

Records. *Canada*: *Alberta*: Banff; Baker Creek, Bow River; Edmonton; Waterton Lake, Waterton Lakes National Park. *British Columbia*:

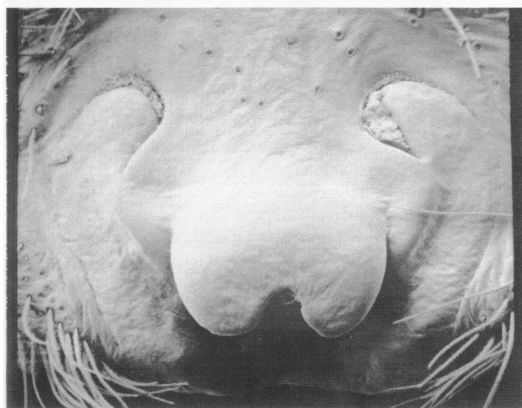
40 mi. NE Radium Hot Springs; Summit Lake. *Manitoba*: Sandilands Provincial Forest. *United States*: *Arizona*: Coconino Co.: N rim, Grand Canyon. *California*: Tuolumne Co.: Tuolumne Meadow, Yosemite National Park. *Colorado*: Boulder Co.: Arapahoe Valley; Red Rock Lake. Chaffee Co.: Garfield; Middle Cottonwood Creek, Monarch Pass, Sawatch Mountains. Custer Co.: Westcliffe. El Paso Co.: Pike's Peak. Gilpin Co.: Cold Spring Camp; Lump Gulch. Gunnison Co.: Avery Flats, Copper Creek Valley, Copper Lake, Elko Park, Gothic, Rustlers Gulch, Silvanite Basin, Tincup, Elk Mountains; Pine Creek Valley, Sawatch Mountains; Snodgrass Mountain; Castle Pass, Ohio Peak, West Elk Mountains. Lake Co.: Climax. Larimer Co.: 10 mi. W Estes Park, Forest Creek Camp, Long's Peak Valley, Rocky Mountain National Park. Mineral Co.: Wolf Creek Pass, San Juan Mountains. Montrose Co.: Iron Springs Camp. Pitkin Co.: Maroon Lake, Elk Mountains. Routt Co.: 8 mi. S Steamboat Springs. Saguache Co.: Cochetopa Pass. San Juan Co.: Silverton. San Miguel Co.: Sunshine Camp. Summit Co.: Breckenridge. *Idaho*: Lemhi



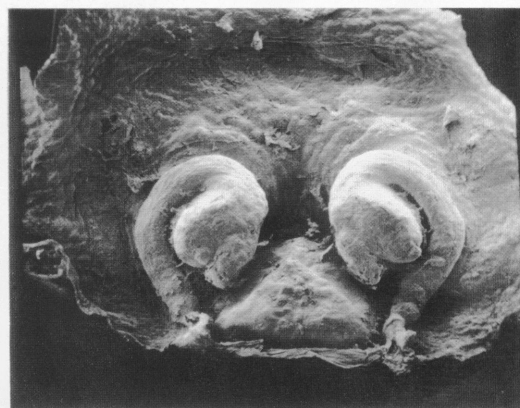
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100



101



102

FIGS. 99-102. *Orodrossus canadensis*, new species, scanning electron micrographs. 99. Embolar region of palp, ventral view, 135X. 100. Retrolateral tibial apophysis, lateral view, 100X. 101. Epigynum, ventral view, 115X. 102. Vulva, dorsal view, 70X.

Co.: 2.4 mi. SW Bannock Pass; Twin Creek Camp, Salmon National Forest. Payette Co.: Payette Lake. Twin Falls Co.: Twin Falls. Valley Co.: Lake Fork; NE McCall. Washington Co.: Lost Lake. *Montana*: Flathead Co.: Big Fork; Flathead Lake; Bowman Lake, Many Glacier Ranger Station, Prey Lake, Swiftcurrent Ranger Station, Glacier National Park. Powell Co.: Bob Marshall Wilderness Area. Ravalli Co.: Skalkaho Canyon; West Fork. Sweetgrass Co.: North Fork, Big Timber Creek. *New Mexico*: Bernalillo Co.: Sandia Mountains. Rio Arriba Co. San Miguel Co.: Lake Katherine Trail, Spirit Lake Trail, Cowles. Santa Fe Co.: Hyde Park; Lake Peak.

Valencia Co.: Mt. Taylor. *North Dakota*: Divide Co. *Oregon*: Baker Co.: Pine Creek. Grant Co.: Beech Creek Camp. Umatilla Co.: Fly Creek Valley. Wallowa Co.: Aneroid Lake. *Utah*: Beaver Co.: Kents Lake Camp. Box Elder Co.: Stillwater Fork, Bear River. Daggett Co.: Deep Creek Camp. Duchesne Co.: Rock Creek, Uinta Mountains. Emery Co.: W Castle Dale; Wasatch Plateau. Garfield Co.: Aquarius Plateau. Grand Co.: 28 mi. ESE Moab. Salt Lake Co.: Little Willow Canyon; Mill Creek Canyon; Salt Lake City. San Juan Co.: Blue Lake; La Sal Mountains. Sanpete Co.: 17 mi. E Mayfield. Sevier Co.: Fish Lake. Summit Co.: Chalk Creek; Coalville; Smith and

Morehouse Canyon; Mill Creek, Uinta Mountains. Utah Co.: Hobbie Creek Camp. Wasatch Co.: Cobble Rest Camp, Provo River. *Washington*: Skamania Co.: Bird Camp, Mt. Adams. Spokane Co.: Newman Lake. Stevens Co.: Cedar Lake. *Wyoming*: Albany Co.: Centennial; Pole Creek Campground, Medicine Bow National Forest; Wallis Campground. Carbon Co.: South Brush Creek Campground. Johnson Co.: Sherd Lake, Bighorn National Forest. Lincoln Co.: Salt Creek. Sublette Co.: Elk Horn State Park; Lower Green River Lake. Teton Co.: Cascade Canyon, Death Canyon, Jackson Hole, Jenny Lake, Leigh Lake, Signal Mountain, Symmetry Spire, Grand Teton National Park; Jackson Lake; Pilgrim Creek, Moran; Teton Pass; Two Ocean Lake; Uhl Hill. Yellowstone National Park Co.: Bridger Bay, Mt. Washburn, Thumb, Yellowstone Lake, Yellowstone National Park.

Distribution. Southwestern Canada and western United States from British Columbia and Manitoba south to New Mexico (map 7).

Natural History. Mature males have been taken from late May through late September, mature females from late March through mid-November. Specimens have been collected at altitudes between 4100 and 12,500 feet under stones, logs, and bark in aspen, spruce, fir, lodgepole pine, and jack-pine forests, in cabins, and in Malaise traps.

Orodrassus assimilis (Banks)

Figures 87-94; Map 8

Drassus assimilis Banks, 1895, p. 420 (male holotype from Fort Collins, Larimer County, Colorado, in MCZ, examined).

Orodrassus assimilis: Chamberlin, 1922, p. 163. Roewer, 1954, p. 406. Bonnet, 1958, p. 3209.

Orodrassus durranti Chamberlin, 1936b, p. 7, fig. 22 (female holotype from Donner Pass, Nevada County, California, in AMNH, examined). Roewer, 1954, p. 406. Bonnet, 1958, p. 3210. NEW SYNONYMY.

Diagnosis. *Orodrassus assimilis* is closest to *O. canadensis* but may be distinguished from it and the other known species by the widened, irregularly serrated tip of the terminal apophysis (figs. 87, 91) and the short median epigynal projection (figs. 89, 93). Some females from Oregon have a posterior notch on the epigynal projection re-

sembling that of *O. canadensis*, but they can be readily distinguished from that species by their longer and more closely spaced spermathecal ducts (figs. 90, 94).

Male. Total length 8.63 ± 0.59 mm. Carapace 3.82 ± 0.25 mm. long, 3.05 ± 0.18 mm. wide. Femur II 3.14 ± 0.23 mm. long (11 specimens examined). Eye sizes and interdistances (mm.): AME 0.15, ALE 0.16, PME 0.15, PLE 0.13; AME-AME 0.18, AME-ALE 0.09, PME-PME 0.21, PME-PLE 0.28, ALE-PLE 0.14. MOQ length 0.49 mm., front width 0.48 mm., back width 0.50 mm. Tip of terminal apophysis widened, with irregular serrations (figs. 87, 91). Retrolateral tibial apophysis with evenly curved ventral prong (figs. 88, 92). Leg spination: femur I p0-1-1; tibia I v0-0-0.

Female. Total length 9.54 ± 1.10 mm. Carapace 4.14 ± 0.24 mm. long, 3.34 ± 0.18 mm. wide. Femur II 3.05 ± 0.18 mm. long (70 specimens examined). Eye sizes and interdistances (mm.): AME 0.18, ALE 0.21, PME 0.16, PLE 0.14; AME-AME 0.17, AME-ALE 0.11, PME-PME 0.23, PME-PLE 0.36, ALE-PLE 0.15. MOQ length 0.52 mm., front width 0.53 mm., back width 0.54 mm. Epigynum with short median projection and depressed atrium (figs. 89, 93). Spermathecal ducts long, closely spaced (figs. 90, 94). Leg spination: tibia I v0-0-0.

Records. United States: Arizona: Coconino Co.: Jacob Lake; Kaibab National Forest. *California:* Alpine Co.: Ebbets Pass. Calaveras Co.: Big Trees. El Dorado Co.: 6 mi. E Camp Connell; Meyers. Lassen Co.: Summit Lake, Lassen Volcanic National Park. Mariposa Co.: Yosemite National Park. Modoc Co.: 20 mi. N Canby; Cedar Pass. Mono Co.: Big Bend Campground, 5 mi. W Lee Vining; Mammoth Lakes. Nevada Co.: Sugar Bowl Lodge, near Norden; Truckee. Placer Co.: Lake Tahoe. Shasta Co.: Mt. Lassen. Siskiyou Co.: Bartle; 8 mi. S Dunsmuir; Panther Road, Mt. Shasta. Tulare Co.: Johnsondale; Sequoia National Park. Tuolumne Co.: Pinecrest; Tuolumne Meadow, Yosemite National Park. *Colorado:* Chaffee Co.: Maysville. El Paso Co.: 5 mi. SW Broadmoor; Cascade. Larimer Co.: Fort Collins. Rio Grande Co.: Highway Springs Campground, 5 mi. SW South Fork. *New Mexico:* Valencia Co.: Mt. Taylor. *Oregon:* Crook Co.: Wildwood Camp,

Ochoco Mountains. Deschutes Co.: Redmond; 20 mi. S Sisters; Oregon Skyline Trail, Three Sisters Primitive Area. Grant Co.: 3 mi. W Dixie Pass, Blue Mtns. Klamath Co.: 11 mi. NE Bly; Sprague River, 12 mi. E Chiloquin; Crater Lake, Sand Bridge, Crater Lake National Park; Lake of the Woods. Lake Co.: Pothole Creek; Willow Creek Camp, Warner Mtns. Lane Co.: Willamette Pass. Union Co.: Fly Creek Valley. Wheeler Co.: 15 mi. SW Mitchell. *Utah*: Beaver Co.: Beaver Canyon. Kane Co.: Mt. Carmel.

Distribution. Western United States from Oregon east to New Mexico (map 8).

Natural History. Mature males have been taken from early May through late November, mature females from early February through mid-November. Specimens have been collected at elevations between 5000 and 10,000 feet under rocks and bark in montane forests with pines, junipers, firs, cedars, aspens, and maples.

Synonymy. Simultaneous collections of both sexes in California indicate that *durranti* is the female of *assimilis*.

Orodrassus canadensis, new species

Figures 95-102; Map 9

Types. Male holotype and female paratype from Lake Opeongo, Algonquin Provincial Park, Ontario, Canada (August 17, 1948; W. J. Gertsch and T. B. Kurata), deposited in AMNH.

Etymology. The specific name is derived from the type locality.

Diagnosis. *Orodrassus canadensis* is closest to *O. assimilis* but may be distinguished from it and the other known species by the recurved tip of the terminal apophysis (figs. 95, 99) and the larger and more posteriorly situated median epigynal projection (figs. 97, 101). The epigynal projection has a conspicuous posterior notch in *O. canadensis*, but as explained in the diagnosis of *O. assimilis* some females of that species also have posteriorly notched projections and that character cannot be used to separate the two populations.

Male. Total length 7.72 ± 0.40 mm. Carapace 3.48 ± 0.35 mm. long, 2.75 ± 0.25 mm. wide. Femur II 2.91 ± 0.33 mm. long (13 specimens examined). Eye sizes and interdistances (mm.): AME 0.16, ALE 0.14, PME 0.14, PLE 0.15; AME-

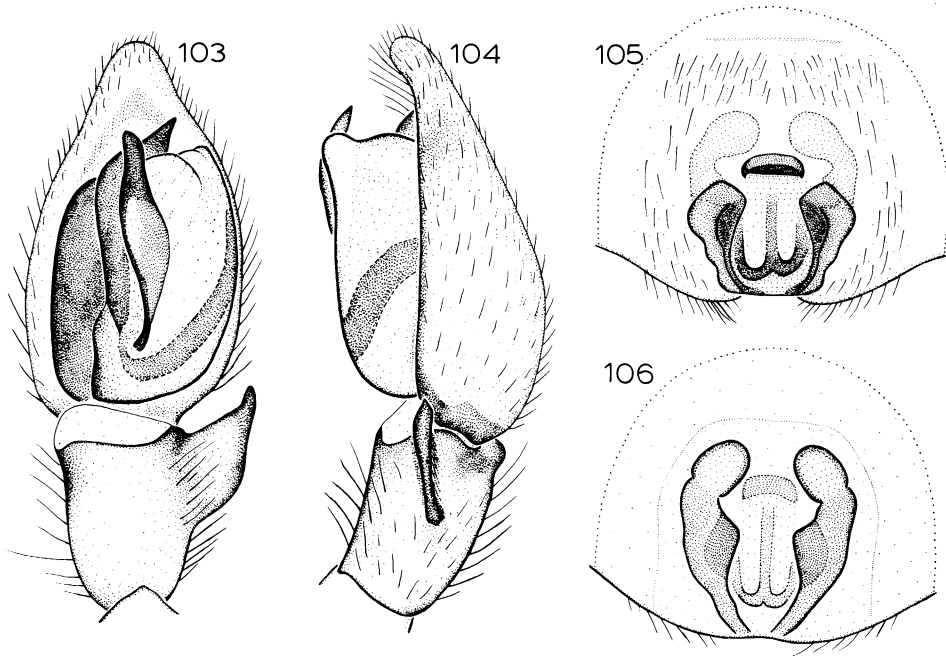
AME 0.18, AME-ALE 0.08, PME-PME 0.18, PME-PLE 0.23, ALE-PLE 0.12. MOQ length 0.47 mm., front width 0.50 mm., back width 0.46 mm. Tip of terminal apophysis recurved, pointing retrolaterally (figs. 95, 99). Retrolateral tibial apophysis with sharply pointed ventral prong (figs. 96, 100). Leg spination: femora: II p0-0-1; III r0-0-1; metatarsus III p1-0-2.

Female. Total length 9.40 ± 0.78 mm. Carapace 3.55 ± 0.18 mm. long, 2.81 ± 0.14 mm. wide. Femur II 2.59 ± 0.17 mm. long (34 specimens examined). Eye sizes and interdistances (mm.): AME 0.17, ALE 0.14, PME 0.14, PLE 0.14; AME-AME 0.18, AME-ALE 0.08, PME-PME 0.20, PME-PLE 0.25, ALE-PLE 0.11. MOQ length 0.47 mm., front width 0.52 mm., back width 0.48 mm. Median epigynal projection large, convex, posteriorly notched (figs. 97, 101). Spermathecal ducts short, widely separated (figs. 98, 102). Leg spination as in male.

Records. *Canada*: *Alberta*: Jackpine Ridge, Fawcett; E Fitzgerald; Harmon Valley; Meander River; 10 mi. E Robb. *British Columbia*: Forbidden Plateau, Mt. Arrowsmith, Vancouver Island. *Mackenzie*: Gros Cap, Great Slave Lake. *New Brunswick*: Fredericton; 25 mi. N St. Jacques. *Ontario*: Sproule Bay, Lake Opeongo, Algonquin Provincial Park; Nipigon. *Quebec*: Camp Le Relais, Laurentides Provincial Park. *Saskatchewan*: Emma Lake; Lady Lake; E William River, Lake Athabasca; Waskesiu. *Yukon*: Swim Lake. *United States*: *South Dakota*: Pennington Co.: Sheridan Lake. *Washington*: Chelan Co.: 16 mi. NW Leavenworth. Jefferson Co.: Bogerhill Park, Olympic Mountains; Hurricane Ridge, Olympic National Park. Pierce Co.: Longmire, Paradise Park, Mt. Rainier National Park. San Juan Co.: Mt. Constitution, Orcas Island. Yakima Co.: Yakima.

Distribution. Canada and northern United States from Yukon and Washington east to New Brunswick (map 9).

Natural History. Mature males have been taken from mid-July through mid-September, mature females from mid-April through mid-September. Specimens have been collected at elevations between 3000 and 5400 feet, in pitfall traps in coniferous woods, in jack-pine (*Pinus banksiana* Lambert, Pinaceae) forests, in cabins, under the bark of stumps, and from the crowns



FIGS. 103-106. *Orodassus orites* Chamberlin and Gertsch. 103. Palp, ventral view. 104. Palp, retrolateral view. 105. Epigynum, ventral view. 106. Vulva, dorsal view.

of black spruce [*Picea mariana* (Miller), Pinaceae].

Orodassus orites Chamberlin and Gertsch
Figures 85, 86, 103-106; Map 8

Orodassus orites Chamberlin and Gertsch, 1940, p. 10, fig. 7 (female holotype from Mt. Rainier, Pierce County, Washington, in AMNH, examined). Roewer, 1954, p. 406.

Diagnosis. *Orodassus orites* is a distinctive species easily recognizable by the presence of two pairs of ventral spines on tibiae I and II, the absence of a ventral prong on the retrolateral tibial apophysis (fig. 104), and by the median epigynal projection not being elevated over an atrium (figs. 85, 105).

Male. Total length 5.98 mm. Carapace 2.21 mm. long, 1.79 mm. wide. Femur II 1.76 mm. long (one specimen, AMNH). Eye sizes and interdistances (mm.): AME 0.08, ALE 0.11, PME 0.09, PLE 0.11; AME-AME 0.13, AME-ALE 0.03, PME-PME 0.13, PME-PLE 0.14, ALE-PLE

0.07. MOQ length 0.31 mm., front width 0.30 mm., back width 0.31 mm. Embolus recessed behind terminal apophysis; median apophysis absent (fig. 103). Retrolateral tibial apophysis laterally expanded, flattened, without ventral prong (fig. 104). Leg spination: femora: II p0-0-1; III r0-0-1; tibiae: I, II v2-2-0; III v2-2-2; IV p1-1-1; metatarsus III r2-0-2.

Female. Total length 7.34±0.39 mm. Carapace 2.73±0.13 mm. long, 2.25±0.12 mm. wide. Femur II 2.12±0.10 mm. long (14 specimens examined). Eye sizes and interdistances (mm.): AME 0.11, ALE 0.12, PME 0.11, PLE 0.11; AME-AME 0.15, AME-ALE 0.04, PME-PME 0.15, PME-PLE 0.17, ALE-PLE 0.11. MOQ length 0.36 mm., front width 0.36 mm., back width 0.37 mm. Epigynum with short transverse hood, long basally expanded median projection, and semilunar lateral margins (figs. 85, 105). Spermathecae elongate, bulbous at tip (figs. 86, 106). Leg spination: femur II p0-0-1; tibiae: I, II v2-2-0; III p2-0-1, v1-2-2; IV p2-0-1; metatarsus III r2-0-2.

Records. United States: Washington: Pierce

Co.: Mt. Rainier, Nisqually Trail, Paradise Park, Mt. Rainier National Park. Snohomish Co.: Miner's Ridge Lookout, Glacier Peak.

Distribution. Western Washington (map 8).

Natural History. The single mature male was captured on August 11; mature females have been taken from mid-July through mid-September. Habitat data are lacking.

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